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Why Business Should Prosper.

"The underlying conditions are on a sound basis," is the general statement of bankers in speaking about business conditions. They predict a great era of prosperity. It is generally believed that business has reached the turning point and is preparing to take the upgrade with confidence in its ability to overcome all obstacles.

The underlying conditions to which reference is made, include the largest store of gold ever held by any country; a crop of nearly a billion bushels of wheat and other crops in relative proportion, despite the so-called "summer of the big rains"; the largest steel business on record, and general trade constantly improving.

Business in general is conducted largely upon credit, which in turn is based upon the store of gold in the banks. The important function of banks is to loan money or rather credit. The actual currency, or money borrowed, is seldom taken from a bank, checks being used in their stead. As a result of this practice, the banks are enabled to loan three to five times the amount of their actual funds. They keep a certain reserve fund on hand which, of course, is always within certain legal limits as regards the amount of credit outstanding.

The amount of reserve is based, fundamentally, upon the store of gold. If the store of gold is large, the amount of credit which may be extended is increased greatly. In periods of prosperity the banks grant credit freely until the ratio between the credit issued, or money loaned, and the reserve becomes too great for safety. There is then a contraction of credit. In other words, the banks begin to build up their reserves and reduce the amount of their loans.

Such was the condition of the country in 1907 when credit was greatly over-extended. People began to demand currency from the banks instead of using checks and the banks could not at once meet the demand, for their reserves were not large enough. They had to demand payment of their loans. Many borrowers were unable to secure funds to pay and business failures followed. Credit was difficult to obtain as everyone wanted money. Hence concerns were forced to economize and construction work ceased.

Since then the ratio between credit outstanding and reserves has been brought to the lower limits. The European war developed an immense market for certain materials and gold has been demanded in payment.

The store of gold which is now in this country is productive of low interest rates on short time loans. As previously stated, the business of banks is to loan money or credit. Just now they have a large stock of their goods in trade on hand and are therefore willing to dispose of it at low prices. The supply is great but there is no market for it, as business is timid. It is gradually gaining confidence, however, and availing itself of the low interest rates.

One of the reasons for this increasing confidence is the large crops which have been harvested and are now being hauled by the railroads to the markets. The crops are fundamentally the basis of trade. When they are large, trade increases; when small, trade is restricted.

Another barometer of business is the iron and steel industry. At the present time the steel plants are operating at from 90 to 95 per cent. of capacity—practically full capacity. While a good share of this activity may be due to war orders, not all of it is attributed to that source. The railroads, which have followed a very economical policy in recent years in the buying of rails and other equipment, have placed some large orders and the demand for other steel products is increasing.

The war has acted as a stimulant in many lines of business, a number of plants being engaged almost exclusively in turning out war munitions and supplies. The activity thus started, however, will not cease with the close of the war. They will be directed to other channels. In fact, many manufacturers are already investigating possible outlets in this country for their future products.

The Man Who Cheats Himself

By HERBERT KAUFMAN

Conceit is self-deceit and eventually self-defeat. Your vanity may blind you but it doesn't blindfold the outsider. When you don't try to locate your weaknesses, you'll discover them through the eyes of your enemies. Humiliation, as well as charity, should begin at home.

Braggarts, sooner or later, are downed by their uppishness. Over-confidence foreshadows negligence. The unwatched dike is soon destroyed. The sneak thief in time finds the unlocked door. Armor was wasted on careless warriors. It was "good night" for a good knight with a chink in his mail. The soldier who neglected to examine his panoply seldom survived the battle.

Bravery loses nothing through caution. The well assured are well insured. You may be brainy and brawny and brilliant, but you can't be impregnable. The assaults of flattery are more to be feared than assault by battery.

The first thought in the mind of the skilled pugilist is to cover his vulnerable points; next, to watch for those exposed by his antagonist. The most important part of winning is self-recognition of the characteristics likely to lead to loss. Your education is sadly deficient until you can read yourself.

The first-class architect thoroughly examines his ground before he formulates his plans—no building is safer than its foundations. The engineer does not proceed until his tests are made. "Do not pile weight upon weakness" is the creed of the erector.

Nobody is constantly right in everything. Genius and leadership are manifestations of lopsidedness. Greatness is specialization. You can't make an intense study of any one thing except at the sacrifice of less essential matters. No matter how prominent you are, you're supposed to be ignorant of many subjects. When you assume omniscience, you presume upon our common sense. Human judgment at its best is never absolute.

Bull-headedness isn't an earnest of will, but an advertisement of willfulness. Determination, not stubbornness, is an indication of character. Intelligent generals scout for the adverse chance and carefully measure the odds before them—retreat is a saner procedure than defeat.

Find your flaws and correct them before a less friendly interest locates impregnability and wrecks you. You're at a tremendous disadvantage, while an outsider has a better conception of your personality than you possess.

Foolhardy force is false courage. A two hundred-pound football player, disdainful of pads, head harness, shin and nose guards, won't endure as long as an undersized opponent with his vitals properly protected. The native strength of the one is discounted by his bravado; the natural inferiority of the other counteracted by care.

Victory is not alone for the ablest, but oftener for those ablest "to see themselves before others see them." We distrust the egotist as much as the liar. There's little distinction between the two. Neither merits confidence. The man who cheats himself is likely to cheat anybody.

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Trans-Oceanic and Intercontinental Telephony

Ocean Telephony with Aid of High-Frequency Currents Over Improved Cables a Solved Possibility—Every Limit of Ocean and Transcontinental Telephony Removed—Abstract of Paper Presented at Panama-Pacific Convention of American Institute of Electrical Engineers

By Béla Gáti

Andrew Carnegie once expressed an opinion that men get to like each other, if they get to know each other. The best means of knowing each other is provided by the various systems of communication. The most agreeable and the cheapest means of communication are the telegraph and the telephone, both of which transmit human thought with gigantic rapidity and to incredible distances. It is a pity that neither the telegraph nor the telephone can fulfill both conditions at the same time.

The distance of successful telegraphy has no limit in theory, but in practice, nobody can accuse the present submarine cable telegraphy of being rapid; considering the matter from another point of view, telephone speech does not exceed the 3,000-kilometer distance. The number of the commercial messages between New York and Denver is very limited. This circuit today forms the longest telephone possibility of the world, in commercial use.*

Improvements in Cable Telegraphy and Long Distance Telephony.

I wish to enumerate the tendency and researches with reference to improvements in both cable telegraphy and long distance telephony. There is in reality no difference between the two kinds of communications. Both the telegraph and telephone employ electrical impulses which are conducted far out upon the electrical conductors. The number of the impulses only is different. We use in the human speech, sounds whose frequencies are as great as 20,000 per second, but are generally only about 1,000 per second; in telegraphy, even the most rapid system does not endeavor to exceed the speed of the human speech, which is about 20 letters per second.

It was Fr. Weinberg who proposed first, in a German electrotechnical periodical (Electrotechnische Zeitschrift, 1909, page 160), the use of high-frequency current for submarine telephony. I have shown in the same periodical, that the high-frequency resistance of a submarine cable of today is so large for Weinberg's currents (about 10^{+80} ohms), that only infinitely small currents arrive at the receiving end (10^{-75} amperes). The proposition was not executable.

George O. Squier†, on the ground of actual experiments on telephone cables, believed that with electric waves (high-frequency currents) long distance telephony and a more rapid cable telegraphy and ocean telephony will be possible. According to Mr. Squier the ohmic resistance of the wire plays a comparatively unimportant part in the transmission. In the discussion of Mr. Squier's paper (pages 1677-1681 in the same volume of the Transactions) I have shown the real effect of the ohmic resistance. Actual experiments on submarine cables were not made either by Fr. Weinberg, Mr. Squier, nor by Gustáv Maior. The latter is a staunch advocate of the use of high-frequency currents for submarine and rapid telegraphy and ocean telephony purposes.

High-frequency current cable telegraphy with aid of inductive shunts has so many features in common with the ocean telephony, that we can treat at once the question of the ocean telephony too. There are two distinct features, which differ in the ocean telephony from the rapid cable telegraphy. In the cable telegraphy we need a minimum attenuation only for one separate frequency; in telephony we need the minimum for all frequencies of the human speech, at least between 100 and 1,000, ultimately up to 2,000.

The voltage of the outgoing telephone current in commercial discourses is about 1 volt; the incoming current at the distant end is 0.1 milliampere; sometimes only 0.05 milliampere (100 to 50 micro-amperes). Hence the total resistance of the cable at ordinary microphones and telephone receivers can not be higher than 10,000 to 20,000 ohms. We had as the limit in the rapid cable telegraphy 1,000,000 ohms.

It has been shown that old type cables can not be used for telephony even to 500 kilometer distances; the continuously loaded cable would be good for 600 to 700 kilometers. Only the shunted coil cable is suitable for ocean telephony, its resistance being only 24,680 ohms at 4,000 kilometers. The length of the South American and African connecting cable is less than 4,000 kilometers and so on these cables ocean telephony is already possible; naturally only with the aid of the one-frequency system.

Professor Sylvanus P. Thompson, 22 years ago, delivered at the Chicago World's Fair his lecture, stating the possibility of ocean telephony with the aid of shunted coils. He failed in the dimensions of his coils, believing the coils must possess a large resistance, so as not to cause considerable leakance.

The shunted-coil cables keep their minimal resistance for one frequency only, although there are now in preparation coils which work equally for all telephone frequencies; the attenuation of the cable remaining about the same for the diverse frequencies of the human speech.

Employing the high-frequency telephony system of George O. Squier on the South American and African cables, we are in need to increase the distance of commercial speech for aerial lines and for other cables too. This can be done by various means, which are briefly enumerated in the following:

1. We employ a higher voltage for the outgoing current; and the use of strong-current microphones.
2. We use more sensitive telephone receivers, which transmit the human speech more distinctly than before. The arriving current can be less, and so the whole resistance of the line greater, and the speaking distance can be increased.
3. We lessen the whole resistance of the line, for instance, using one-wire telephony for long distances, or Krarup Pupin methods, inductive shunted coils.
4. We employ telephone relays, for strengthening the received currents.

Strong Current Microphones.

By using a higher voltage in the ordinary microphones, the speech causes greater variations in the current strength of the microphone circuit; our outgoing telephone current will have 30 to 40 volts tension instead of one volt as with the ordinary microphone. In such a manner the expression of $Zo \sinh (L\beta)$ can be increased, and still we get the received current strong enough for commercial purposes.

The results of a strong current microphone compared with an ordinary microphone at various distances are given in Table No. I.

The microphone tested, constructed by the author, had a

*Since this paper was written, the New York-Denver commercial service has been extended to San Francisco.—Ed.

†Multiplex Telephony and Telegraphy by Means of Electric Waves Guided by Wires, George O. Squier. Transactions of the American Institute of Electrical Engineers, 1911, Vol. XXX. Part II, pages 1617-1664.

water-cooling device. The strong current microphone could not come in general use; only in Sweden are the Egnér-Holmström microphones commonly used. They can be used only in those countries where the insulation of the long distance lines is well maintained, and the public is more accustomed to the separation of the speaking from the listening position.

Because the tension of the outgoing current is greater, the

	Distance in kilometers	Strong current microphone		The received current in percentage of the outgoing.	Ordinary microphone		Remarks
		Outgoing	Received		Outgoing	Received	
		current in microamperes			current in microamperes		
1.	404	16,625	2363.8	14.22	6125	848	8 km. cable
2.	922	17,500	1484	8.48	7000	296.8	8 "
3.	1188	15,750	720.8	4.57	5250	190.8	8 "
4.	1592	18,025	265	1.47	7000	127.2	16 "
5.	2110	16,625	159	0.956	7000	0	24 "
6.	2514	21,875	50	0.23	4375	0	30 " with paper insulation was also connected into it.

Table No. 1. Strong Current and Ordinary Microphones.

insulation of the line is decreased. Using 10 times greater voltage, the insulation is decreased about 50 per cent. In the formula of the minimum attenuation, $\beta = \sqrt{gr}$; g is increased by this and so β is increased also. We have with strong current microphones on poorly insulated lines, a worse effect than with an ordinary microphone.

The outgoing current is strong; we cannot keep the receiver to the ear for the outgoing current. We must change the speaking and listening positions. This is not possible in every country, because the change requires a specially intelligent subscriber. The method is used in the Scandinavian countries, where the Egnér-Holmström microphones attained a better result.

It has been shown that the effective resistance of the receiver also plays a role, especially for long distances. In this respect very little has been done. Using one receiver (American method) instead of two (European custom), we can gain sometimes 500 kilometers distance in long distance speech.

The sensitiveness of the receiver can be raised considerably, but nothing has been done in this direction. The researches need a well equipped laboratory and long, live lines. The question could be settled only by organized research of an international institution.

The best results in telephone transmission have been obtained in the past decade by loading. We employ the continuously loaded lines (Krarup system) and the loading with inductive coils at given distances (Pupin system). The shunted coils are not yet used on continental lines or cables.

The Krarupization seems to be better on very short cables

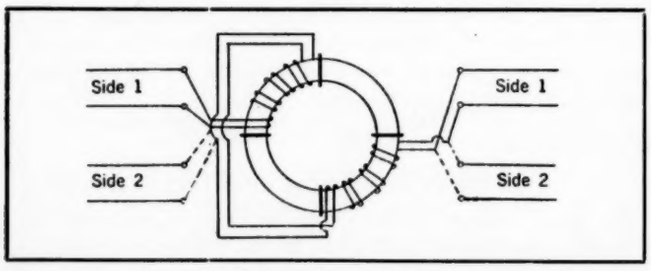


Fig. 1. Winding of Loading Coil for Use on Phantom Circuits.

and on very long ones, because it is difficult to distribute the Pupin coils on short distances.

The formula $r : l = g : c$ gives the minimal attenuation of β ($\beta = \sqrt{rg}$).

We use for long distance telephony such lines in which r is already a small quantity; we do not need a strong increase of the inductivity of the line. The Krarup cable increases moderately the inductivity and so it is sufficient in this case. The Pupin coils have, today, 5 to 15 ohms' effective resistance. Thus they can not be used for lines with a small resistance, for instance, copper wires of five millimeters diameter. Certainly the Pupin coil can still be improved considerably.

By reducing the resistance r of the line by connecting two two-wire circuits in parallel, we obtain a very good result. The so-called phantom circuit of the New York-Denver line was constructed in this manner. Fig. 1 illustrates the Pupinizing method of this four-wire circuit*. To avoid confusion the windings for but one side of the phantom are shown.

Table No. II shows the different line coefficients at various diameters of the wires of telephone circuits and the total resistance of the telephone circuits.

The complex quantities are given in their two forms (polar and rectangular co-ordinates). The Heaviside formula for the wire of five millimeters diameter is

$$\left(\frac{1.7}{1.56 \times 10^{-3}} > \frac{10^{-6}}{10.47 \times 10^{-9}} \right)$$

instead of the equality. Increasing the insulation from 10^{-6} to 10^{-7} (diminishing the leakage) the formula $r : l = g : c$ holds good and we can get the minimum attenuation without loading or with a minimal loading, which may be installed cheaply.

One of the best methods of amending the insulation is the

Diameter of wire...	3.	4.	4.5	5
r resistance.....	5.	2.8	2.21	1.7
l inductivity.....	$1.49 \cdot 10^{-3}$	$1.43 \cdot 10^{-3}$	$1.58 \cdot 10^{-3}$	$1.56 \cdot 10^{-3}$
c capacity.....	$11.00 \cdot 10^{-5}$	$12.00 \cdot 10^{-9}$	$10.27 \cdot 10^{-9}$	$10.77 \cdot 10^{-9}$
g leakance per kilometer.....	10^{-6}	10^{-6}	10^{-6}	10^{-6}
Z_0 wave resistance	377.912 (− 18° 1'.43) 359 .389 − j 116.93	348.459 (− 5°17' .85) 346.98 − j 32.175	394.11 (− 3° 41' .57) 393.29 − j 25 .379	387.13 (− 2° 49' .66) 386.65 − j 19 .1
α attenuation.....	$41.58 \cdot 10^{-3}$ (80°27' .67) $68.90 \cdot 10^{-4}$ + j $410.018 \cdot 10^{-4}$	$41.8169 \cdot 10^{-3}$ (84° 13'.09) $42.126 \cdot 10^{-4}$ + j $416.06 \cdot 10^{-4}$	$40.748 \cdot 10^{-3}$ (85° 43'.76 / 30.143 · 10^{-4} + j $403.66 \cdot 10^{-4}$	$40.533 \cdot 10^{-3}$ (86° 36'.46) $16.918 \cdot 10^{-4}$ + j $404.99 \cdot 10^{-4}$

Distance kilometers	Total resistance of the line in ohms.			
	3 ϕ	4 ϕ	4.5 ϕ	5 ϕ
1000	185.720 (−9° 7'. 44)	11.768 (+ 40°31' .01)	4,909.10 (−31°30' .12)	1,024.03 (−24° 00'.35)
2000	182,160,009.504 (+ 0° 13'.47)	801.390 (− 81° 29'.86)	81, 801.47 (−58° 53'.55)	
3000			1,665,351.216 (−86° 5'. 53)	11, 377.70 (− 62° 32'.61)

Table No. 2. Values of Line Coefficients and Total Resistance.

use of one simple wire. The 50 per cent. of the leakance places and leakages are avoided. I experimented with one-wire long distance telephony on telegraph lines; the distributing effects of the earth currents are very simply and easily surmountable. Devaux-Charbonnel first proposed† the one-wire telephony for submarines cables. We have seen that the problem of submarine (ocean) telephony is only possible with the one-wire cable system.

Devaux-Charbonnel did not propose the one-wire system for land-line telephony. It is not profitable for common use. We can not permit other conductors in the neighborhood of the wire. We can not use our transcontinental telephone wire mounted on the same poles as our other telephone circuits. The inductive effects affect the resistance of the wire. Currents are induced in the neighboring wires which dissipate the energy. It seems ultimately, as if the resistance of the one

*The Commercial Loading of Telephone Circuits in the Bell System, Bancroft Gherardi. Transactions of the American Institute of Electrical Engineers, 1911, Vol. XXX, Part III, pages 1743-1764.

†Télégraphie et Telephonie. Devaux-Charbonnel. La Lumiére Electrique, 1913, No. 6, pages 164-168.

single wire would be doubled or tripled. Two-wire circuits do not possess this peculiarity, being free from outside induction.

The one single wire has only half the resistance of the double wire circuits, but the change of the inductivity and capacity counteracts this effect, the inductivity decreases and so it is again suitable for loading; the capacity increases, which makes some loading desirable again. When the capacity is balanced in the sense of the Heaviside formula, the attenuation of the single wire circuit is only half of that of the double wire circuit, using the same diameter of the wire.

For the balanced five-millimeter double wire ($r = 1.7$, $g = 10^{-6}$) circuit β would be $\sqrt{1.7 \times 10^{-6}} = 1.30 \times 10^{-3} = 13 \times 10^{-4}$ instead of 16.91 (Table No. II) at the unloaded circuit. Loading the five-millimeter diameter single-wire circuit, we could obtain an attenuation

$$\beta = \sqrt{\frac{1.70}{2} \times \frac{10^{-6}}{2}} = \frac{13 \times 10^{-4}}{2} = 6.5 \times 10^{-4}$$

The length of a 10,000-kilometer wire multiplied by this attenuation would give $\beta L = 6.5$. $\beta L = 4$ is the commercial limit of today of the telephone discourse; we reach this limit at 6,100 kilometers.

Of course, it is not permissible to carry conductors in the neighborhood of the Big Creek 150,000-volt transmission line, or other disturbing circuits. The future transcontinental telephone must be free from these disturbances. The insulation must be well maintained. We have much to do in this respect, because, strange to say, no telephone lines are measured with telephone frequency currents, least of all the insulation.

It is very difficult, if not impossible today, to get a circuit over 2,000 kilometers, without insulation faults. Measuring the transcontinental lines daily and with the telephone currents, we shall be able to maintain the proper insulation after we have thrown out the existing latent faults, which are very numerous. We need, for long distance international telephony, a much better organized service and better methods than are customary today.

The considerable strength of the disturbing currents hinders the use at present of telephone relays. I have found that the disturbing effects over 1,000 kilometers have already a greater intensity than the incoming current itself. By relaying these currents, the disturbing currents will become magnified and finally totally obliterate the speech currents.

Considering the problem from this point of view, I will discuss only briefly the relays which might be successful in the future, especially on one-wire transcontinental telephony free from disturbances.

S. G. Brown uses a granular carbon microphone in a sealed capsule and connects this with the tongue of a very sensitive magnetic relay.

Telephone-receiver microphone relays were tried by many inventors, but without success. Mr. Brown worked out the principle very carefully and gained a good result. Mr. Brown has another system of high-frequency current relay, where the air-gap resistance between osmium and iridium surfaces is changed by the vibratory movements of a very fine relay tongue, the vibrations being caused by the high-frequency currents. The relays are not in use on commercial circuits.

To avoid the inertia of the magnetic relay, inventors have tried to use the cathode ray action. Lieben constructed the first cathode ray relay; later he and his collaborator, Reis, relinquished the pure cathodic ray action principle and formed the electron relay. Lee de Forest patented his audion also. Both the Lieben-Reis relay and Lee de Forest audion work on the electron principle.

The cathode (covered eventually with Wehnelt's alkali-earth metal salts) is heated by an electrical current; a metallic obstacle is placed in the way of the electrons which are thrown out from the cathode (the bored-out plate of the Lieben-Reis construction, and the grid in de Forest's audion). When we have no potential on the plate or on the grid, the flow of the electrons is not changed. But it is possible to arrange the conditions in such a manner that a minute change of the potential causes a considerable increase of the electron current. Magnification of from 20 to 30 times can be produced in this way. Because there is no inertia present, and no movement of relay tongues or anything similar, the speech is not distorted.

Their present application is very uncommon. It is quite certain that under favorable conditions of the telephone circuits, a considerable distance can be reached. However, we need to insert the relay before reaching 1,000 kilometers, and so for transcontinental speech more relays (three to four) are necessary.

Telephone relays will play an important role in the future of transcontinental and ocean telephony. We need today better circuits and fewer disturbing effects, which can be obtained only through a careful investigation and research organization. Because these electron relays are not in common use yet, I will not go into details.

I have explained in this paper the present situation and the hopes of the rapid cable telegraphy, and of the ocean and transcontinental telephony, and I presume that the prediction made in Professor Sylvanus P. Thompson's lecture in 1893 will soon become a reality, and thus telephone communications across the Atlantic and the continents will be able to aid future generations in avoiding misunderstandings.

Joint Valuation Committee to Attend I. C. C. Conference.

At the Hotel Claypool, Indianapolis, during the convention of the Indiana Independent Telephone Association and immediately following the meeting of the board of directors of the National Independent Telephone Association, a meeting was held of the joint committee on telephone valuation. There were present: Chairman S. G. McMeen, of Columbus, Ohio; G. W. Robinson, of St. Paul; A. F. Adams, of Kansas City, and Wm. Fortune, of Indianapolis.

The committee entered into an extended discussion of the proposed valuation of telephone properties by the Interstate Commerce Commission. A conference of representatives of telephone companies has been called by the commission for October 5 in Washington. The committee voted to attend this conference and instructed the secretary of the committee, F. B. MacKinnon, to notify all companies affected by the order of that intention and to invite all such companies to send to the secretary any suggestions or questions that may seem desirable to bring before the Interstate commission.

National Association Convention in December.

The board of directors of the National Independent Telephone Association held a meeting at the Hotel Claypool, Indianapolis, Ind., on September 15. There were present: C. Y. McVey, A. F. Adams, S. W. Harper, H. B. McMeal, H. D. Critchfield, A. G. Bean, S. G. McMeen, T. W. Allen, N. G. Hunter and F. B. MacKinnon.

After receiving reports of various standing committees the directors took up the question of fixing the date for holding the next annual convention of the association. It was decided to hold the convention in Chicago, December 8, 9 and 10. This early date for holding the convention should appeal to many who have in the past objected to the inconvenience of attending the convention during the busy period immediately following the first of the year.

Convention of Indiana Independent Association.

On Wednesday and Thursday of this week the Indiana Independent Telephone Association held its annual convention at the Hotel Claypool, Indianapolis, Ind. It was impossible to secure a report in time for publication this week but a full report will appear next week.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—Part I, Telephone Economics, by James H. Shoemaker, Completed June 26, 1915—Part II, The Corporate Telephone Organization, Written by J. C. Kelsey and S. R. Edwards

Quiz Questions on the Preceding Installment.

79. What are the by-laws of a corporation?

80. What are usually specified in by-laws relative to stockholders' and directors' meetings?

81. Do by-laws state in detail the duties of the officers?

82. What are customary provisions in by-laws relative to a company's securities and other papers?

83. State some of the general provisions relative to corporate management which are usually covered in the by-laws.

84. What may be said relative to stating in the incorporation papers the number of members of which the board of directors shall be composed? In general, what is included in the by-laws?

85. What is the capital of a corporation?

86. Of what is a stock certificate evidence? How is stock variously spoken of?

87. What is meant by the term "authorized stock"?

88. What is "issued stock"?

89. Define "treasury stock." What is necessary in order that stock become treasury stock?

90. What is "founders' stock" and how does it rank?

91. What is the ordinary classification of the capital stock of a corporation?

92. Define "preferred stock." Into what classes is it divided?

93. What are the interests of common stock?

94. What is a mortgage? How does it differ from a bond?

CHAPTER VII. Stocks, Bonds and Promoters (Cont'd).

95. *Promoters and Promotion.*—According to Webster, "A promoter is one who sets on foot and takes the preliminary steps in a scheme for the organization of a corporation, a joint stock company or the like."

In the telephone business much has been said about promoters. The entire tendency of the statements regarding promoters is that they are all unscrupulous, unreliable and irresponsible. The idea prevails that a promoter is a sort of a Wallingford-Blacky Daw combination. Such an idea is not a proper one.

Promotion is an English profession. It is looked upon as a legitimate business and the promoter is accorded none of the odium that hedges about him in America. Possibly English promoters have money. American promoters do not, and that is why they are promoters. American promoters try to get something out of nothing, while the English promoter attempts to consolidate something into something more.

96. *Examples of Legitimate Promotions.*—In a legitimate promotion, there is much work to do. It takes a long time to convince people. It takes much persuasion to convince underlying stockholders to accept new securities or even to sell. It requires skill and effort, as well as expense, to convince investors to buy into the combination of even successful plants. It requires an acquaintance with bankers and a definite responsibility to be a real legitimate promoter.

Suppose Smith & Co. had a cracker factory which earned 12 per cent. on $250,000; Johnson & Co. had an investment of $150,000 and earned 10 per cent.; Jones & Co. had a $100,000 investment which earned but 7 per cent. There was much price cutting and it was more or less desirable to get together. There was an actual investment of $500,000 and a net earning of $52,000.

The promoter organized a company with $500,000 6 per cent. bonds, $250,000 cumulative 7 per cent. preferred stock and $250,000 common stock. He gave the original holders $500,000 worth of bonds, or an income of $30,000 a year. He also gave them $250,000 worth of preferred stock, representing an income of $17,500. He divided the common stock with them and came out of the deal with $125,000 of common stock as a promoter's fee.

With prices restored and promised economies of centralized management, the chances are that the common stock will earn 8 per cent. and become valuable enough for the promoter to sell.

A trolley system was organized entirely from the sale of stock. The actual cost of the system, complete, was an even million dollars. The promoter capitalized the company as follows:

$1,000,000.....5 per cent. bonds.
500,000.....6 per cent. preferred stock.
500,000.....common stock.

The money secured from the sale of the bonds and preferred stock was as follows:

$1,000,000 bonds sold at $80 per $100 face value, or $800,000.
500,000 preferred sold at $90 per share, or $450,000.

The proceeds of the sales were therefore $1,250,000, which left, after paying for the construction of the system, $250,000 in the treasury. This sum, in addition to the railway property, was controlled by the holders of the common stock, which had the only voting power, and represented 50 cents on the dollar in cash.

97. *Some Telephone Promotions.*—The American Union Telephone Co., of Harrisburg, Pa., was a combination of underlying companies which failed to work out. The promoters of the consolidation had the following financial plan:

$25,000,000.....5 per cent. bonds.
25,000,000.....6 per cent. preferred stock.
25,000,000.....common stock.

They sold all the securities in such a way as to get par for the bonds and preferred stock together. The bonds were sold at $80, preferred stock at $20 and the common stock given to the buyer. An investor of $1,000 thus found himself with a $1,000-bond, $1,000 in preferred stock certificates and $1,000 in common stock certificates. It was too good to last, and the investor of $1,000 got about $20 out of the wreck of the enterprise.

The Kansas City Home Telephone Co. was capitalized at $6,000,000 in which there were $3,000,000 of bonds and $3,000,000 of stock. The bonds paid for the plant, and the stock cost the promoters nothing, yet the value of the common stock advanced to $125 per share. Had the promoters kept the common stock, they would have had a profit of $3,750,000 on a $3,000,000 investment of other people's money.

Another Independent telephone company when it reached a stock issue of $200,000, voted a bond issue of $200,000 and gave it to themselves as a present. This was done so that in case the Bell company obtained control of the stock, the investment in the property would not be imperilled. It is not often that watered bonds occur.

98. *Promoters' Contracts.*—Promoters' contracts are a source of considerable dispute. Corporations not yet in existence cannot be bound. In many states a gift of stock is held to be illegal, but in Delaware, Maine and other typical states, promoters have a right to arrange for stock for services. A promoter must disclose all the facts, or a subscriber of the stock has full recourse. He is liable for misrepresentation and especially for withholding facts.

The promoter must have a disinterested board of directors pass upon the value of his services. Usually he gets what is coming to him if the company accepts the benefits of his efforts.

99. *Underwriting of Securities.*—The most important contract is that of guaranteeing and underwriting the stock. The act of underwriting stock means a subscription to a part or all of the stock with an agreement of payment at some future date. These contracts are made with banks, syndicates or groups of financiers who agree to dispose of the stock and pay for it if the sale is slow. Sometimes the syndicate sells the stock to the public and never has to advance a dollar.

Organizers of corporations are considered promoters and their subscription contracts are binding. Each subscriber is liable to the others if he fails to make good. There is also a further liability to the corporation itself and to the creditors as soon as certificate of organization is issued by the state.

On the whole, it is the underwriters of securities which have made the money. The promoter usually passes on and into another industry. The telephone promoter once promoted gas and electric companies. After he left the telephone field, he tried irrigation, Everglade reclamation and other typical undertakings. As long as the world lasts, the promoter will be among us.

CHAPTER VIII. The Franchise for Operation.

100. *The Primary Franchise or Charter of Incorporation.*—In section 49 (TELEPHONY, August 14) it was stated that telephone companies are quasi-public corporations or public utilities as they perform a service for a community as distinguished from an individual or a particular number of individuals. Public utilities, in order to carry on their business, require special franchises or powers in addition to the charter granted them as a corporation.

The charter of incorporation granted by a state to a company is called a primary franchise. It confers upon a public utility only the rights and privileges of an incorporated body as has been set forth in preceding sections of this part of "Fundamental Principles of the Telephone Business." In other words the primary franchise or charter relates to the form of organization of a company. It does not confer authority to build lines and operate in state, county, city or town.

101. *The Secondary Franchise for Permit for Construction and Operation.*—Before a telephone corporation can begin to use public streets or highways for the construction of its plant, preliminary to operation, it must secure a special permit or franchise. This is what is usually called a secondary franchise.

A secondary franchise is necessary for the specific thing the telephone company has set out to do—the right to carry on its business in municipality, township and county; in other words, to construct, maintain and operate a corporation authorized by a primary franchise.

102. *Sources of Franchises for Telephone Companies.*—Secondary franchises for telephone companies are granted by the state, and municipality. The term municipality includes the divisions of a state such as county, township, city, town or village. The state laws specify the powers of municipalities in regard to their rights in granting secondary franchises. In some states cities of certain classes are empowered to grant a franchise to a telephone company while outside the city limits, the state franchise is all that is necessary.

103. *The State Franchise.*—Some states have general laws which give a corporation the right to carry on a telephone or telegraph business and entitle it to the use of the roads, highways and public lands of the state. The right to construct telephone lines upon the streets of a municipality comes from the state. A municipality is a part of the state government and has powers only as granted in its charter.

A city may pass ordinances but they must not conflict with the laws of the state. The state retains control over streets and highways and can prevent any action on the part of a city to make the streets and roads obstructive to traffic. The cities are, however, usually given authority by the state to regulate the use of streets.

104. *The Municipal Franchise.*—Cities may grant license to a telephone company, but the state can prevent the license from being put to use. When the state does ratify the city's action, the construction of the plant is subject to such municipal control as to guarantee public safety and convenience. In other words, the secondary franchise granted to the telephone company, puts it under the police power of the city.

Accordingly, in order to legally acquire rights on the city streets, the municipal authorities must be petitioned, setting forth in clear language the name of the streets, the side of the streets to be used, the size and location of the poles, and the character of such construction as may be anticipated. This gives due notice to the city as to the character of the burden the city must contend with. *(To be Continued)*

Massachusetts Ruling Relative to Stock Ticker Service

Gold & Stock Ticker Telegraph Co. and United Telegram Co., of Boston, Ordered to Restore Sevice to Boston Broker for Quotations of New York Stock Exchange—Subject Matter Held to be Intrastate in Character

An important decision was handed down on September 7 by the Massachusetts Public Service Commission in which the board ordered the Gold & Stock Telegraph Co., by the Western Union Telegraph Co., lessee, and the United Telegram Co., of Boston, Mass., to restore stock ticker service to Calvin H. Foster, of Boston, on the ground of unjust discrimination.

The petition was filed March 4, 1915, and a public hearing was held on April 21, which was reported in TELEPHONY of May 15. In view of the entrance of discrimination into the case and of the contention of the respondents that the transactions of the companies with reference to the transmission and distribution of stock quotations were interstate in character and that the Massachusetts commission therefore had no jurisdiction in the premises, the finding is of particular interest to public utilities dealing with the transmission of intelligence. It is anticipated that the case will ultimately be carried to the Supreme Court of the United States.

The respondents claimed: First, that the commission is without jurisdiction and that the Interstate Commerce Commission is the arbiter to which the petitioner should have appealed. Second, that the respondents have no legal right to deliver the quotations desired to persons other than those approved by the New York Stock Exchange, as provided in the contract which each of the respondents has with the exchange.

The petitioner stated that he has been unable to secure ticker service since December, 1914, and contended that he is a member of the New York Stock Exchange, has always complied with its regulations and the laws of the state and desires to make no improper use of the service. He further urged that his business will suffer irreparable damage if he is unable to procure the quotations desired. These allegations were not denied by the respondents who stated that the New York Stock Exchange had notified them that the petitioner's applications had been disapproved but did not furnish the commission with the reasons for such disapproval. The New York exchange was not represented at the hearing.

RELATIONS OF RESPONDENTS TO N. Y. STOCK EXCHANGE.

In its decision the commission reviews the essential facts of the case as previously published in TELEPHONY. The board then discusses the economic value of stock quotations. The New York Stock Exchange is a voluntary association limited to 1,100 members, furnishing facilities to its members for the buying and selling of stocks and bonds. It is now the largest market for securities in this country, if not in the world, and its importance in the economic system can hardly be exaggerated. The quotations when collected are property. See Stock Exchange vs. Board of Trade, 127 Ill. 153; Kinsey company vs. Board of Trade, 198 U. S. 236; Hunt vs. New York Cotton Exchange, 205 U. S. 322. The dissemination and distribution of these quotations are not a favor to the public granted by the exchange. It is a service rendered which is productive of profits.

In the contract between the exchange and the Western Union company, acting for itself and as lessee of the Gold & Stock company, the exchange agrees, at its own expense, to furnish quotations at a cost of $50,000 per year, the telegraph company being permitted to furnish or retail such quotations to any person whether a member of the exchange or not, anywhere in the United States or Canada outside a prescribed area in New York City, provided such person is approved by the exchange. In the contract between the exchange and the United Telegram company, the exchange agrees to furnish quotations by a ticker installed in the New York office of the Postal Telegraph Cable Co. at the rate of $9,000 per year. The Telegram company is restricted to retailing these quotations to subscribers in Boston, and the contract contains a similar approval provision to the above.

PUBLIC CHARACTER OF SERVICE.

The underlying question discussed by the board is whether the respondents, in supplying these quotations by means of "stock telegraph systems," are engaged in furnishing a service for public use within Massachusetts. The business differs in kind from the transmission of messages for public hire and the duty of the Western Union company to the public in its telegraph business is not involved. The Massachusetts courts have not passed on the question, but it seems clear in principle that the respondents are engaged in rendering a service for public use.

The quotations sold and distributed are not only convenient and advantageous to a large section of the public but are a necessity in certain important lines of business. They cannot be furnished without the special privilege of using the public ways for the lines and cables essential to the service. The granting of such a special franchise or privilege indicates that the business carried on by the respondents was considered public in character. It was held in New York & Chicago Grain & Stock Exchange vs. Board of Trade (127 Ill., 163):

> Assuming these market quotations and reports are property and the private property of the Board of Trade, yet if they have been so used by the board, and by the telegraph company with the knowledge and consent of the board, as to become affected with a public interest, then they are subject to such public regulation by the legislature and the courts as is necessary to prevent injury to such public interest. . . . The doctrine as applied to the matter of these market quotations would forbid that a monopoly should be made of them by furnishing them to some and refusing them to others who are equally willing to pay for them and be governed by all reasonable rules and regulations, and would prevent the Board of Trade or the telegraph companies from unjustly discriminating in respect to the parties who will be allowed to receive them. See also Inter-Ocean company vs. Associated Press, 184 Ill., 450.

OBLIGATION TO PERFORM SERVICE.

The commission holds that it is too well established to require further citation of authorities that one engaged in rendering a service for public use cannot, without legal reasons therefor, refuse to furnish such service to a particular customer if the service demanded be of a character which it holds itself out as prepared to furnish to the public of the class to which the applicant belongs. The respondents contend that the contracts between them and the New York Stock Exchange, providing for the right of approval by the exchange of the patrons for these quotations and service, furnish legal grounds for their discrimination against the complainant. This contention the board holds unsound, but it grants that approval or disapproval with the object of confining the use of quotations for proper purposes within the law is laudable and wholesome. This confines to a very narrow area the grounds upon which the exchange can exercise the right to disapprove applications. The commission says:

> "There is no room here for caprice, prejudice or malice; nor any room for a mere suspicion that the applicant desires the quotations for an unlawful and improper use; nor any

room for any reason whatever other than the fact that the quotations are desired by the applicant for an unlawful and improper use. . . . Assuming that the quotations of the New York exchange are not affected with a public use or public interest and that the exchange may withhold them entirely from the public, yet when it sells its quotations to the respondents with a view to their dissemination and distribution it is not making contracts for the sending of ordinary telegraph messages but is making contracts with parties engaged in the business of furnishing and rendering a service for public use, and whose whole duty to the public is the supplying and furnishing of market quotations. See Smith vs. Gold & Stock Telegraph Co., et al., 42 Hun., 454; New York & Chicago Gold & Stock Exchange vs. Board of Trade, 127 Ill., 153.

"And this duty cannot be hampered or restricted by any arrangement or contract between the parties. When property is sold or leased to those furnishing or rendering a service for public use it becomes affected with a public interest and there can be no restrictive covenants. See Delaware & American Telephone & Telegraph Co. vs. Delaware, 50 Federal, 677; Commercial Union Telegraph Co. vs. New England Telephone & Telegraph Co., 61 Vermont, 241. To hold otherwise would be to permit those engaged in furnishing or rendering a service for public use to commit to other individuals, corporations and associations, the right to determine their public duties in respect to furnishing service."

The respondents contended that the commission should assume that the exchange acted in good faith and disapproved the petitioner's application on the grounds that he desired the quotations for an unlawful and improper use. The commission refuses to make any such assumption and points out that it is the duty of the courts or of any regulating and supervising body established by the legislature to determine on the evidence before it whether or not unjust and unreasonable discrimination is made by persons, natural or artificial, engaged in rendering a service for public use.

It was open for the exchange to appear at the hearing and submit any evidence it might have, if any, of the unlawful and improper use for which the petitioner desires the quotations, and the board takes it that the respondents promptly notified the exchange of this proceeding, under the spirit of their contract. There was no evidence whatever that the petitioner desired these quotations for unlawful and improper use. If the exchange can, by disapproving the petitioner's application and without submitting evidence of intention to use quotations improperly and unlawfully, keep the respondents from furnishing him with these quotations and ticker service, it may thus without producing any evidence cut off anyone for any reason or without reason. "Such a power in this country is unthinkable," says the opinion.

Interstate vs. Intrastate Character of Proceedings.

There is involved in this case, as the board views it, no question concerning the duty of a telegraph company to the public in its ordinary telegraph business. There are no messages, in the ordinary sense of the word as used in the amendment of June 18, 1910, Acts of Congress, where authority to regulate companies transmitting intelligence outside a state, was vested in the Interstate Commerce Commission. The respondents purchase in New York City a certain commodity. They are under no obligations to the exchange to send this property anywhere.

In order to re-sell or retail it in Boston the respondents have it conveyed or shipped to Boston by the only means by which it can effectively be conveyed—over fast-wire telegraph lines, in the case of the Gold & Stock Telegraph Co. over the wires of the Western Union company, and in the case of the United Telegram Co., over the wires of the Postal Telegraph-Cable Co. It is delivered in Morse code at the main offices of the respondents in Boston and at these offices is translated into words and numerals in the ordinary alphabet and is sent out over their respective stock telegraph systems to their various patrons.

"There is no doubt, of course," says the decision, "that while it is being conveyed over the wires from New York to the main offices of the respondents in Boston it is a commodity or property moving in interstate commerce over which Congress has jurisdiction. But in our opinion the jurisdiction of Congress ceases when the property is delivered at the main offices in Boston. After it is delivered there the respondents are under no duty or obligation to the exchange to re-sell or distribute it.

Justice McKenna said, of moving picture films shipped into the state of Ohio, speaking for the court in Mutual Film Corporation vs. Industrial Commission, 35 Supreme Court Reporter, 390 (1915), 'There must be some time when the films are subject to the laws of the state, and necessarily when they are in the hands of the exchangers, ready to be rented to exhibitors.' There must, of course, be some time when the commodity or property in question in this case becomes subject to the laws of Massachusetts. In our view, it is when the quotations are delivered at the respective main offices in Boston.

If, however, we are in error in this view, as there has been no specific action by the Interstate Commerce Commission dealing with the subject matter in controversy in this case, and as it is not clear that this matter is within the previously mentioned amendment of June 18, 1910, we hold that until Congress or the Interstate Commerce Commission takes some specific action this commission has jurisdiction. Indeed the duty of the companies to give service with substantial impartiality and without invidious discrimination is a common-law duty not dependent upon legislative enactment or administrative order.

It would seem beyond question that in the absence of any specific action by Congress or the Interstate Commerce Commission there resides in the state courts and commissions at least concurrent power of remedial action. The order for the removal of the discrimination complained of in this case is an enforcement of the common-law duty of the companies and cannot be said to impose any tax or burden upon the interstate transmission of the quotations nor to embarrass, obstruct or impede the full and fair performance of service to any persons or corporations not within jurisdiction of this commission. . . . See also Manufacturers' Light & Heat Co. vs. Ott, 215 Federal, 940, where it was held that a state commission may regulate the price to be charged by gas companies furnishing natural gas to consumers within the state, although some of the gas supply is piped from other states.

. . . The respondents, if they furnish or supply to any customer in Boston the quotations of the New York Stock Exchange by means of ticker or "stock telegraph system," must furnish or supply them without unjust and unreasonable discrimination to all customers within the district or districts supplied by their respective services who will comply with all lawful regulations connected with said service, and who desire said quotations for lawful and proper use."

Alabama Commission to Regulate Telephone Rates.

Authority to regulate rates of all telephone and telegraph companies doing business between cities and in cities of Alabama was conferred upon the Alabama Railroad Commission by a bill introduced by Representative Cooper, of Marengo, which was passed with only six dissenting votes. The bill provides that the commission may have supervision over all rates on intrastate and intracity business and may change them by lowering or increasing it if it thinks they are not equitable.

This bill is intended to supplement the existing laws relative to the commission's powers in regard to regulation of rates. In October, 1911, the Alabama commission ruled that it had no jurisdiction over exchange rates.

September Equinoxes

War Stocks—Loans—Credits

By J. C. Kelsey

You remember Von Kluck? He was commander of the famous right wing of the German army. He moved so fast that he could not stop. In fact, his army got ahead of his artillery.

The vigilant aeroplane, soaring above, signaled to General Joffre and General French. Immediately, the French, English, Turcos and Senegalese pushed forward, and caught the on-rushing army in a trap. But they were not prepared to take full advantage of their victory, so the German army executed a masterly retreat to the River Aisne where they still are.

Then and there the complacent Englishman, the nervous Frenchman and the Russian realized something. They realized that the German machine had grown up. It was no longer a standard European army but a super-army.

They realized that the crowd with the largest pocketbook and the greatest supply of munitions and foodstuffs, was to be the winner.

It was not an old-fashioned war at all. It was an economic war, a war of chemistry, physics and new units—not men, but regiments of men; not rifles, but machine guns; no smooth-bores of three inches but great rifles of eighteen inches.

Before Von Kluck began his retreat, there was a company in America known as the Electric Boat Co. It was a non-producer, as it were, and its stock sold hesitatingly at $16 per share.

The company had a small business in launches and it furnished a congenial occupation for the heirs of the Isaac Rice estate. It was a nice place for young men to work who belonged to polo teams and sailed in palatial yachts.

Suddenly the company received an order. The stock began to boom and the heirs of the Rice estate received an offer for their quiet running factory. That offer was $142.50 per share for stock which had been thrown about at $16. Naturally the unsuspecting heirs sold and sold quickly.

The company was renamed the Submarine Boat Corporation. It was liberally recapitalized and today the stock sells at $522 per share.

A well known automobile company had a large junk pile. The cars it traded in, the defective parts and everything thought to be useless, were cast into that pile.

An agent for a foreign government happened to cast his eye upon the pile—and he offered $3,000,000 cash for it. Needless to say, the management jumped quickly at the bait.

Today, the stock of the company has increased $25,000,000, all because General Von Kluck got to moving so fast that he left his artillery behind.

The Crucible Steel Co. was another concern which seemed to be in the last stages of consumption. The price of the stock went begging at $12.50 per share. Today, the price of the stock is $95, all because the French and English armies happened to have some sharp-eyed aeroplane drivers.

The United States Steel Corporation has had quite a career in the courts and industrial world. Its stock has gone downward and heavenward several times since you grew up.

About the time General Von Kluck began his great enveloping movement, the stock was quoted at $38 per share. It increased 104 per cent. and reached $77⅝ per share. This, in ordinary figures, shows an advance in steel shares of $201,500,000.

Little did we dream that the on-rushing Turcos would have such an effect. We may as well realize that the earth is a very small place.

After the Allies had chased Von Kluck back, and found him dug in deep, they came to a stop.

They did some active thinking. They sent purchasing agents to America by the boat load. Manufacturers, in return, got to going to Europe by the boat load.

Naturally there was great price inflation. And with the abnormal inflation of prices, followed stories of graft, which finally set England by the ears.

Out of this storm came the selection of Morgan & Co. as American agents. Morgan & Co. selected a man by the name of Stettinius, who now has 300 picked men, all of whom are on the job of munitions and supply buying.

No one can guess the profits of the house of Morgan. However, it nearly cost the life of the senior member. All because Von Kluck and his splendid machine worked too easily.

Now enters another exhibit in the great financial circus. Three men are in America from Europe trying to make a deal whereby the famous English pound will retain its life-long value of $4.8665.

It is said that Morgan & Co. sent a special emissary to England to inform them of the inevitable slackening of the value of their money. But the representative struck the cold English iceberg and returned to his country to await the outcome to his predictions.

It is agreed by everyone that the regulation of exchange is most important. It took much time for these over-confident Europeans to see it.

It is necessary to provide for the stability of the pound, franc and the ruble, before satisfactory trading can be done. It would make some difference in the price received by America and the price paid by Europe. It would make a situation almost as bad as the man who forgot to specify American dollars instead of Mexican, which at one time, were worth fifty cents of our money.

Naturally, there is a great wave of opposition to any financial deal with England and France. This comes on the part of the Americans of German birth, who, it will be remembered subscribed freely to a German loan during the year.

Regardless of the merits of the matter, it is proposed to borrow $1,000,000,000, to be spent entirely in America for wheat, cotton, meat and supplies.

James J. Hill says the 400,000,000 bushels of surplus wheat must be disposed of if the farmer is to have his share of the profits. In other words, the job of feeding the world must be backed by the credit of the world.

Local bankers of Chicago have already been visited by stockholders and depositors of German extraction. They have been warned not to go in on the deal. If they did, resignations of directors and withdrawals of deposits would begin at once.

They are said to have gone so far as to threaten "runs" on the banks, which are bold enough to participate. All because the vigilant aeroplane drivers saw that Von Kluck had forgotten to bring his artillery forward.

American merchants, who ordered goods from England a

year ago, have less money to pay. One hundred thousand dollars' worth of goods paid in American dollars cost $94,000.

If the merchant had contracted for goods from a French house, the $100,000 in francs would cost $84,000. If he contracted in German works, he would have to pay $85,000.

The English merchant, in buying from America, would pay in English money and it would cost him $106,000. The Frenchman would pay $116,000, while the German would pay $115,000.

This merely means that the credit of the various nations has been damaged to that extent.

If England would promptly pay its bills, as would France, the purchasing power of her money would automatically go to par. This could be done by sending us gold, but strange to say, Americans do not want gold and Europe does not want to send gold.

This country already has $200,000,000 in gold lying idle. Money cannot be loaned at a profit now. The more gold we receive, the higher our prices may go, and with it, inflation and speculation.

So the Russian, Frenchman and Englishman are trying to solve the question in New York today.

As we in the telephone business look around, we cannot get very much satisfaction out of the fact that the stock for great war order factories have gained a half billion in value. We cannot look favorably upon the plan to give the warring nations credit to the extent of $1,000,000,000.

This is really a loan and it bears 5 per cent. interest. It puts our 5 per cent. bonds in competition with the bonds of powerful governments of Europe. It puts industrial securities here, in competition with governments, which have always been assumed to be best of all.

We know something of the ease with which municipal 5's are sold. But what municipality has the credit of an England or a France? That is our issue in this proposed loan.

For the sake of the sale of wheat, meat, and supplies, do we care to sacrifice a bond market? In other words, will the prosperity that will come to us indirectly, compensate for the direct losses in security sales?

Who ever dreamed that our industrial 5's would ever have to compete with the 5's of great governments? All because General Von Kluck allowed his artillery to fall behind the infantry and cavalry. Strange, isn't it?

In the telephone business we have had much contest over the ownership of our securities. Money has not been considered an impersonal thing at all. The moment it was discovered that an enemy owned a bond or a share of stock, then the excitement began.

But in spite of the patriotism expected of various telephone institutions men have gone along at all times by the rule of pocket.

We shall now see if the German element is powerful enough to cause the rejection of the British plan. Or if they are willing to accept the losses which come to them by the rejection of the plan which alone can keep business near par in America today.

The whole theory of corporation government seems to be "get the money." It does not seem to be a question of how the money was obtained, just so they get it.

We had a great revival of public conscience for a time, and it seemed as if some of our predatory rich were going to repent and restore their ill-gotten gains to the people who had lost them. So far we have no record of any restitution.

We have few records of men who have a chance to sell and who refused to do it because of the particular identity of the buyer. Therefore, it is proper to abuse the seller rather than the buyer in some of our telephone deals.

General Von Kluck was too sure of Paris. He was thinking of his particular Parisian restaurant and what he was going to eat. He forgot a very important item—but did that affect our business?

It has not made any telephone stock double and triple. It did even cause much gain in gross receipts. But let us content ourselves that it has not caused a loss. Our business is not speculative—it is purely and simply one of investment. It goes on day in and day out, with few thrills, but has managed to keep its credit at par.

No one can say that the telephone pound is worth a cent less than $4.8665.

We should welcome the day when every telephone wreck is out of business. We should gladly wish for the day when every man, who has lost a dollar in the telephone business, shall have a chance to recover it.

What we want is, not the acknowledgment of a Morgan, but the appreciation and gratitude of our investors.

Nothing hurts us so much as some tumble-down, credit-destroyed telephone company. It is better to let it die or be sold out to any one foolish enough to buy it.

Again I repeat, our business will not reach its full glory until every man in it loves it and gives his investors due return for the money they have confided to his care.

May we have more Washingtons! Only last week you read in TELEPHONY of the good Pennsylvania plant which has come back.

That was the best news of the week.

General Von Kluck forgot his artillery. It did not affect your business. Nothing can affect it as long as you give it sympathy, support and hardwork. It is the best business on earth.

MORAL: Beware of war stocks.

Citizens Company, of Grand Rapids, Has Good Year.

The year ending June 30, 1915, was a most prosperous one for the Citizens Telephone Co., of Grand Rapids. The number of telephones was increased 1,007, making a total of 14,009 in use. There were increased investments of $93,266. Of this amount $29,050 were spent for underground conduits and cable lines and $39,918 for new poles.

Depreciation for the year figured up to $157,422, of which $146,320 was actually spent. A large part of this sum was expended in Lansing and Grand Rapids, the two big exchange centers where the company operates.

The earnings during the year were $900,177, $355,316 of which came from the Grand Rapids office. Outside earnings were $361,617. Toll-line revenue amounted to $150,900, with $22,625 as interest on income.

A dividend of $231,105 was paid during the year. Of the income $4,495 was appropriated for the sinking fund. A surplus of $18,388 was reserved out of the earnings. There was a net increase of $117,260 in resources. There are outstanding in the hands of the public $505,500 in bonds.

Pennsylvania Independents Discuss Operating Rules.

Representatives of all the Independent telephone companies in western Pennsylvania and a number from Ohio met at Newcastle, Pa., September 7 and 8 to discuss the new set of operating rules recently adopted by the companies in that section of the state. As stated previously in TELEPHONY the Western Pennsylvania Independent Telephone Association has adopted the long distance operating rules recently issued by the Ohio State Telephone Co. The meetings were held at the Fountain Inn Hotel, with Franklin R. Hillhouse, division manager of the Union Telephone Co., of Erie, in charge of arrangements. This was the first of a series of similar meetings to be held in that vicinity.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

183. Outline the two functions of the impedance coil in the common battery circuit shown in Fig. 75.

184. Outline briefly two methods of making condensers for telephone use.

185. Why is the condenser voltage at a minimum when the charging line current is at a maximum?

CHAPTER IX. Common Battery Substation Circuit (C't'd).

186. *Desirable electrical features of impedance coil.* Let us refer again to the impedance coil shown in Fig. 75. It will be remembered that the function of this coil is, roughly, to filter out the direct current for the transmitter supply from the composite current flowing over the telephone circuit. Inasmuch as this coil is designed for such a purpose, it must have the greatest possible self induction and the lowest possible ohmic resistance. Through self induction of large value, it will be more effective in confining the voice currents to their proper path. By low resistance, it will offer the smallest possible obstacle to the transmitter battery feed. The desirable electrical features in an impedance coil for this purpose are:

High self induction.

Low resistance.

187. *Action of impedance coil in substation instrument circuit.* It may occur to the reader that the action of this part of the equipment follows a somewhat more complex law than would appear on first inspection of the circuit. This is true, although the action of the impedance coil and transmitter is susceptible of very clear and easily understood explanation. Let us review for a moment some of the attributes of a well designed impedance or choke coil.

It has been shown in previous sections that the self induction of any coil causes it to oppose any *change* in the strength

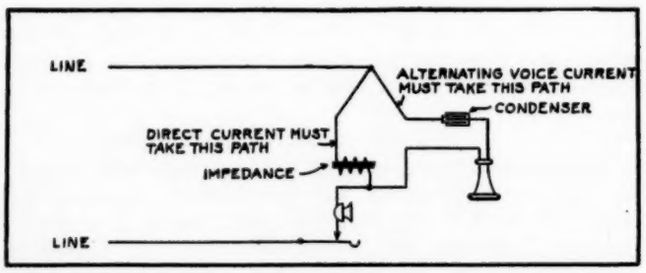


Fig. 75. Impedance Coil Type of Common Battery Circuit.

of the current flowing through its windings. That is to say, the impedance coil will oppose the sudden start of a current in its windings, the sudden increase in an existing current strength, and the sudden stoppage or reduction of an existing current.

We have also seen that the transmitter, through the effect of the sound waves upon its diaphragm, interposes a variable resistance in the circuit. This variable resistance is utilized in the producton of an alternating voice carrying telephonic current. In the common battery circuit under consideration there is an impedance coil in series with the transmitter and its battery supply. If this comprised the entire arrangement the effect of the impedance coil would prevent telephonic transmission. The self induction, opposing any sudden or rapidly changing variation in the current, would render the transmitter entirely useless. In other words, the variations produced in the resistance of the transmitter by the vibration of its diaphragm would not produce their natural and necessary effect on the strength of current flowing.

The impedance coil, through its self induction, accomplishes precisely the desired result. When the resistance of the transmitter is increased, for illustration, the impedance coil has the effect of maintaining the current flowing in its windings at the same or very nearly the same value for a short time. When the transmitter resistance, on the other hand, is decreased, it is impossible, for a short time, for any increase of the current flowing *through the winding* of the impedance coil to result. Since the increased resistance of the transmitter, in the first case bars the flow of the current through itself, the condenser receives an additional charge. When the transmitter resistance is decreased, the condenser surrenders a part of its charge into the circuit through the decreased resistance of the transmitter and the line wire to the exchange.

188. *Analogy of impedance coil action.* An analogy taken from everyday life may be used to illustrate this action. Many cities are supplied with water through a municipal waterworks system in which the pumps empty into a reservoir or standpipe. In such systems, the reservoir or standpipe is analogous in its action to the condenser in the common battery telephone circuit under consideration. The pumps would occupy an analogous position in the waterworks system to one occupied by the impedance coil in the telephone instrument circuit. That is to say, they would always maintain a constant flow of water from the source of supply. The service to the users would correspond to the transmitter in that it would be of high resistance at times and of low resistance at others. When a great number of faucets were open, the resistance might be said to be low. When only a few were open it would be high.

Now in the case of a sudden large demand for water, the supply in the reservoir or standpipe would be drawn upon to assist the pumps in supplying the required amount. When the demand upon the service was light, the pumps would still

pump the same amount of water per second, but a large part of it would be diverted into the reservoir or standpipe.

In a very similar way it may be roughly stated that when the transmitter resistance is high, the current is diverted into the condenser. When the resistance is low, the condenser

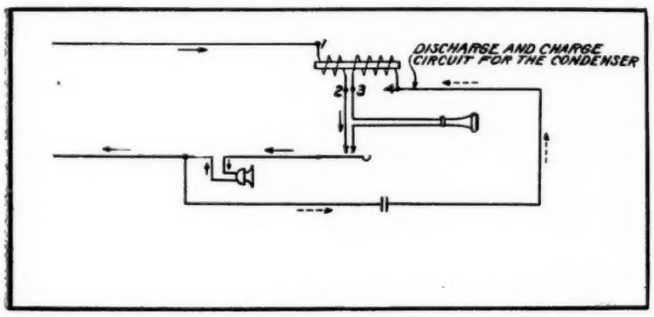


Fig. 78. "Boosting" Condenser Common Battery Wiring.

supplies a part of the increased current flowing over the line through the transmitter.

It should be very clear, therefore, that the condenser charges and discharges as the transmitter resistance is varied by the action of the sound waves on the diaphragm. If the variations in the transmitter resistance should extend over a longer period than they do, this effect would be less perfect. In other words, the impedance of the coil is due in part to the high frequency of the telephonic voice currents as well as to the number of turns and the strength of the current flow.

189. *The condenser boosting common battery telephone circuit.* In Fig. 78 is shown the arrangement of the circuit used by one of the largest operating telephone companies. The operation of this circuit is somewhat different from the circuit shown in the previous discussion. This circuit includes an induction coil similar in many ways to the induction coil used in local battery telephone instruments.

In this circuit any decrease in the resistance of the transmitter, will cause an immediate increase in the strength of the current flowing through the induction coil primary winding 1 and 2. But this decrease in the transmitter resistance disturbs the condition of the closed circuit which may be traced through the condenser, secondary winding of the induction coil 3 and 4, receiver, hook switch and transmitter. The condenser which has previously received an initial charge from the line seizes the path of reduced resistance and discharges through this circuit in the direction of the dotted arrow.

The sudden discharge of the condenser through the secondary winding will, as we have seen, produce *another induced* current in the primary winding in the opposite direction around the core. But this *induced* current is seen to have the same direction as the original increased battery feed current flowing through the winding of the primary.

If the transmitter resistance should be increased, the current flowing in the primary winding would be decreased in strength. In this case the condenser would *receive an additional* charge through the secondary winding. In so doing it would induce a current in the primary winding in *opposition* to the original current flowing through it. This would, of course, have the effect of still further reducing the strength of the current flow in the primary circuit.

In this way a condenser connected, as shown in Fig. 78, into the circuit of the common battery telephone instrument has a "boosting" effect on the transmission currents sent out.

There are many variations of the common battery telephone set, each of which possesses some distinctive advantages, but in every case an application of the same principles may be employed to analyze the effect secured in telephonic transmission. In the discussion, no ringers have been shown. This is because the ordinary ringer does not appreciably help or hinder the transmission. *(To be Continued.)*

Ohio State Is Extending Its Facilities in Columbus.

The Ohio State Telephone Co. is busily engaged in extending its facilities for telephone service in Columbus. In keeping pace with the growth of the city it is putting in underground and overhead cable and new central office equipment in the Fifth avenue, Indianola, Blake and Clintonville districts.

In the Fifth avenue district cable and switchboard facilities for 900 lines will be opened about October 1. In the Indianola district the exchange building on Thirteenth avenue has been doubled in size and will have an ultimate capacity of 1,000 lines. These facilities will be open for service approximately October 1. In the Blake sub-exchange at Blake avenue and North High street, 200 additional lines have been installed to take care of particularly the new Glen Echo addition.

A new sub-exchange will be built at Clintonville at the corner of Oakland Park avenue and North High street where a lot has been purchased and plans for a new building have been drawn. In this section 1,000 new lines will be provided and the facilities will be open for service about December 15.

The plant expenditure in this North section of the city will amount to approximately $79,000,000.

Extensions in the Franklin Park exchange, which is the territory east of Champion avenue and between Main and Broad, have been completed at an expenditure of $32,000. Estimates for extensions in other parts of the city are in course of preparation and will be taken up in turn as soon as the work in the north side of the city is finished.

The company reports a substantial monthly net gain in stations.

Meeting of American Association of Engineers.

At a meeting of the American Association of Engineers at the Hotel LaSalle, Chicago, September 14, the principal address was made by Prof. F. H. Newell. Professor Newell pointed out the causes which have brought engineers to the necessity for an awakening. The distinction between engineers and mechanics was stated to be education. In obtaining this education the engineer is indebted to someone and as a body they owe a duty to the state and to society, as well as to their profession. The ethics of the engineering profession were touched upon after which the question of service was discussed at length.

Some interesting statistics in regard to the number of men who may be classed as engineers were presented and the opportunities of the field were stated to be practically unlimited, but in order to properly take advantage of the opportunities it is essential for the engineer to cultivate qualifications which are embraced under the term of salesmanship. The need for an organization of engineers for raising the standard of ethics and to protect their economical and social affairs was pointed out. Professor Newell outlined the five specific channels along which the American Association of Engineers intends to work to accomplish these results.

Other addresses were made by President W. D. Wilcox and Garrison Babcock.

A most attractive emblem in the shape of a button has been adopted and many of the buttons were in evidence at the meeting.

Example of Modern Chivalry in American Business Life

Chivalrous Regard of the New York Telephone Co. for Its Large Staff of Women Employes—Selection of Applicants to Protect Operators from Undesirable Influences—Protection for Moral Welfare, Comfort and Health of Operators

By Leonhard Felix Fuld, Ph. D.

Critical observers of American life and manners have always been quick to recognize the natural chivalry of American men. They have, however, sometimes said that this chivalry is more noticeable in social life than in the business world. For example, men who raise their hats while riding in a hotel elevator in the company of women, do not trouble to do so in an office building elevator. Similarly, men who rise quickly to offer their seat in a car to a woman in the evening during the theater hour, remain seated while business women are standing in the car during the business rush hour.

That these isolated illustrations are not characteristic of the attitude of the American business man, is clearly evidenced by the chivalrous regard which the New York Telephone Co. has for its large staff of young women employes. And although the solicitous care afforded these young women by their corporate employer is probably greater than that afforded to any other class of women employes, there are many other employers who afford their employes protection which is similar in kind though less in degree.

Care in Selection of Telephone Operators.

In selecting its telephone operators the New York Telephone Co. is scrupulously careful to select only young women of robust health and of good family. Good health in an employe is necessary for the efficiency of the corporation as well as for the happiness of the individual employe. Good character and home influences, on the other hand, are insisted upon by the telephone company primarily for the purpose of protecting its other employes from undesirable influences. This solicitude for the moral welfare of its employes continues throughout their period of employment.

At each telephone exchange the company employes a matron—a middle-aged woman who is neither of the domestic type nor of the sociological investigator type. She is rather a woman of the motherly type, quick to gain and retain the confidence of the young women employes. She learns their views of life and their associations at home and during their hours of leisure. She gives them advice and assistance, not as a superior officer but as a friend and counsellor. She is loved by the employes as the typification of the mother spirit and serves the company by keeping it informed regarding the moral attitude of its employes. When a girl leaves her home without a good reason or when she shows by her dress or manner in the office that her views of life or her manner of living have changed, someone in the exchange will suggest to her that perhaps it would be desirable for her to devote her time to less confining work than that of telephone operating. With a minimum of friction her resignation is secured and the other employes are protected from contamination.

To provide a continuous public service some of the telephone operators are obliged to work at night. Women workers at night are peculiarly subject to insult in our American cities because their presence on the street at night is frequently misinterpreted. To protect its operators from such annoyance the corporation arranges to have the girls go home in groups and if necessary it furnishes them with an escort. Recently a crowd of four rowdies insisted upon congregating in front of the exchanges and speaking to the girls when they left the building.

A representative of the company was sent quietly to the captain of the police precinct in which the exchange was located. It was explained to this official that no notoriety was desired but that this annoyance was to be stopped quickly and effectively. On the next evening four stalwart policemen in plain clothes were on hand and explained to these rowdies in the language and in the manner in which they best understood, the message that such conduct would be tolerated neither by the telephone company nor by the city authorities. Althought some of the rowdies suffered severely from this lesson in gentlemanly conduct and behavior, no complaint was made by them. Rowdies are generally cowards.

Provision for Operators' Comfort When Off Duty.

The telephone company provides also in each exchange a lunch room, restroom and a locker room. In the locker room each employe has a sanitary wire screen locker, in which she can keep her outer garments without danger of their being infected by the clothing of fellow employes and without danger of their contaminating the clothing of other employes. The restroom contains rocking chairs and other easy chairs for the use of the young women during their rest periods, periodicals which they may read when at leisure and a couch and emergency equipment for their proper treatment in case of sudden faintness or illness. In the lunch room the telephone company provides the operators each day with sugar and milk and facilities for preparing a warm luncheon, free of charge. It also gives them the privilege of sending the company's messengers and office boys to nearby restaurants for such food supplies as they may desire. All of this service is furnished to these young women principally to preserve their health and comfort, rather than to promote the efficiency of the company's service. Yet the preservation of the employes' health and comfort is certain to promote the efficiency of the corporation's service.

When a subscriber swears at a telephone operator this does not interfere in the least with the efficiency of the corporation's service. It is an insult to the employe of the corporation, but all of the corporation's employes are taught to accept abuse received in the line of duty without undue complaint, or harsh retorts. When a young women employe is insulted in this way, however, the New York Telephone Co. takes energetic measures to protect her because she is a woman.

A representative of the company who is mild mannered but astute visits the offending subscriber. He introduces himself by explaining that the purpose of his visit is more disagreeable to the representative of the company than it is to the subscriber. He suggests to the subscriber that it was only thoughtlessness which caused him to forget himself. Perhaps he did not think of it that he was swearing at a woman. The representative suggests that whenever the subscriber wishes to swear because of trouble with the telephone service, he should first call for the manager of the telephone exchange who is a man. He may then swear at the manager. The representative of the company calls the subscriber's attention to the fact that the manager of his exchange is a particularly quiet man who has never been known to swear, excepting once when he did swear. And by the way, he could swear very well when he started. The subscriber usually digests these courteous suggestions and promises to bear them in mind.

Sometimes a subscriber is obstinate, and says that he will swear at the operator whenever he pleases. In such a case the representative of the company says that if he repeats the

offense his telephone service will be cut off. The subscriber may doubt the power of the mild mannered representative to carry out such a threat and may even suggest that the telephone company will be liable to respond in damages for such an interference with the subscriber's service. The representative will explain that he has the power of stepping to any telephone and stopping the subscriber's service in five minutes and that no court will compel the telephone company to pay the subscriber substantial damages for the interruption of his service if it is shown to the court that it was cut off to protect the company's young women employes from the subscriber's abusive language.

To go to so much trouble and expense for the purpose of protecting its young women employes from insult, annoyance and abuse, and of safeguarding their health and morals in the manner which has been described, is an example of modern chivalry in American business life that has never been surpassed and has probably never been equalled.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

New York Automatic Company Fights for Use of Conduits.

John C. Sheehan, John M. Shaw and men affiliated with them in control of the Long Acre Electric Light & Power Co., and now in control of the Public Service Telephone Co. of New York City, have under way proceedings to compel the use of public conduits for the Strowger automatic telephone.

The franchise under which the right is asserted is the same as that under which the Long Acre company successfuly fought for the use of the conduits of the Consolidated Telegraph & Electrical Subway Co., controlled by the New York Edison Co. The telephone company hopes to obtain use of the conduits of the Empire City Subway Co., which is controlled by the New York Telephone Co.

The Public Service Telephone Co. has a capitalization of $10,000,000 stock, half common and half preferred, and $25,000,000 first mortgage 6 per cent. bonds. Its officers are: President, John M. Shaw, who is also president of the Long Acre company; vice-president, Albert J. Appell; treasurer, Alexander Davidson; secretary, John A. L. Campbell; directors, the foregoing and Clarence D. Simpson, George L. Graham, John C. Sheehan and Russell H. Robbins.

Samuel H. Wandell, who, with Stephen C. Baldwin and Martin Littleton, appears for the company, explained that the franchise under which the company makes its claims was granted in May, 1887, to the American Electric Mfg. Co. It conferred permission to construct and use wires, conduits and conductors for electric purposes in the city.

Two years later the franchise was assigned to the late William H. Kelly, a former police magistrate. In 1909, the telephone privileges of the Long Acre company were assigned to the Public Service company, which was then incorporated in New York state.

Last spring, Mr. Wandell said, the company served a demand for use of conduits on Walter Brown, secretary and treasurer of the Empire City Subway Co., offering $2,000 for a year's rental. The demand was refused. Mandamus proceedings are scheduled for argument before Justice Greenbaum in the Supreme Court early next month.

The board of estimate has declared the franchise void and the corporation counsel appeared as a party in the court proceedings.

Mr. Wandell said the company can start installing the system if it wins the suit. It plans, he said, not only to install the automatic system in New York City, but to connect with Independent telephone companies all over the country.

Central Union Not Required to Pay Local Franchise Tax.

That the Central Union Telephone Co. is not bound to pay local taxes upon its franchise and that Assessor Daniel J. Goggin, of Peoria, Ill., was without authority to assess it upon its franchise, is the decision of Master-in-Chancery Wead.

Goggin assessed the company $50,000 upon its franchise in addition to its real and personal property. The franchise tax amounted to $930.71. This sum the Central Union company refused to pay and filed in the circuit court a bill for relief and injunction. Judge Niehaus granted a temporary injunction restraining B. H. Onken, city collector, and Louis J. Gauss, county treasurer, from collecting the tax.

W. T. Whiting represented the city and Stevens, Miller & Elliott were attorneys for the Central Union Telephone Co. and its receivers. They entered into a stipulation of the facts and the case was heard solely on the right of Goggin to assess the franchise.

In part the master finds:

"That the validity of said franchise taxes depends upon whether or not the complainant was within the true meaning and intention of section 108 of the revenue act of this state, a corporation 'organized for purely manufacturing and mercantile purposes,' or either of such purposes.

The master finds that the complainant, the Central Union Telephone Co., was not organized for purely manufacturing and mercantile purposes; the said Daniel Goggin, as assessor of the town of the city of Peoria, was without lawful right or authority to levy or assess any tax or imposition upon the franchise of said complainant, and that the action of the said Daniel J. Goggin as such assessor was without legal right or authority, and the tax so assessed pursuant to his actions as aforesaid, was and is null and void.

The master finds that the equities herein are with the complainant; that they are entitled to the relief prayed for in the bill of complaint, and that the injunction heretofore issued in this cause should be made perpetual."

California Law Prohibiting Telephone Train Dispatching.

At a hearing on the applications of the railroads of the state of California for relief from provisions of the new law requiring a train dispatcher at every siding, considerable testimony was adduced tending to show the growing use of the telephone over the telegraph in the dispatching of trains. Among the witnesses examined were J. W. Walker, superintendent of the Santa Fe's Valley division; Santa Fe Conductor Robertson and Engineman Hansen. They testified as to their experience in the dispatching of trains by telephone, and said it was an excellent, direct and safe method. They said the telephone system enabled them to travel with less delays, and that the more miles they made in a day the more money they made.

The point was brought out by the railroads that letters had been received from nearly every railroad in the United States

showing that all of them were using the telephone system in the same measure as it was used by California roads, and that if the California railroads should turn the telephone system down it would be settling a precedent for the entire country.

The bill which was passed by the last legislature provides that the railroad commission may suspend the action of the law where it sees fit.

Compulsory Physical Connection in Canada.

The Dominion Board of Railway Commissioners, on September 14, rendered an important judgment, dealing with the form of a draft order granting compulsory connection between Independent telephone companies and the lines of the Bell Telephone Co., of Canada for long distance messages.

Assistant Chief Commissioner D'Arcy Scott and Commissioners S. J. McLean, A. S. Goodeve and W. B. Nantel, find one way, while the chief commissioner, Sir Henry L. Drayton, dissents.

The majority judgment sets forth that the question of competition between the Bell and Independent companies is not of concern to the Railway board. If the companies are unable to agree, then the company desiring the connection may apply to the board to order the connection, upon such compensation as the board deems just and expedient.

The board orders that Clause 6 of the draft shall read:

"On the request of the applicants, the Bell company agreeing thereto, it is agreed that no surcharge or other charge, save the ordinary long distance toll, shall be made by the Bell company to a municipality, corporation, Independent company or system which is non-competing.

Each of the applicants so connected shall pay the Bell company the following annual charges, payable half-yearly in advance, from the date of the connection hereunder, namely:

(a) The sum of $100 so long as such company has not more than 250 subscribers.

(b) The sum of $200 so long as such company has over 250, but not more than 600 subscribers.

(c) The sum of $300 so long as such company has more than 600 subscribers."

Sir Henry Drayton, in the dissenting opinion, holds that the long distance connections with competitive companies is disadvantageous to the Bell, and advantageous to the Independent companies. The best evidence of this fact, he says, is that the Independents ardently desire it and urgently press their claims.

The compensation which the board deems just and expedient is for actual use, connection or communication, for actual facility supplied, and its subsequent use cannot be so construed as to include compensation for loss in business that the Bell company may experience as a result of competitive companies having the long distance connection. The losses to the Bell, Sir Henry says, result from the loss of local subscribers and their annual rent. Telephone duplication makes for public inconvenience, and he says that experience has shown that in one Ontario municipality at least, as sure as the Bell company left the field as a result of popular sympathy for a local institution, the rates were immediately raised by the local concern.

New Exchange for Waco, Texas, Consolidated Plants.

The Texas Telephone Co., with headquarters in Waco, Texas, announced early this week that work would be commenced at once on its new general office and exchange building in Waco. Upon completion of the building and the installation of new central station equipment, the Texas company is to take over the local exchange of the Southwestern Telegraph & Telephone Co., in Waco. The company expects to occupy its new quarters some time in February, 1916.

The new building will be of fireproof concrete construction, three stories and basement, about 55 feet in width and 120 feet long. It will be modern in all respects and of pleasing design. The general offices of the company, with the local commercial offices, will occupy the first floor; the terminal room and operators' rest rooms and dining room the second floor, and the operating room will be on the top floor.

An ordinance authorizing the Texas Telephone Co. to purchase the Southwestern exchange in Waco, and to consolidate the two exchanges, was passed by the City Commission of Waco in August, 1914, allowing 18 months or a reasonable time thereafter for the consummation of the project. The Texas Telephone Co. has also purchased the Southwestern exchanges in Marlin, Moody, Walnut Springs, Meridian and Clifton, Texas, and has merged the same with its own local plants in those places. Similar mergers have been authorized at Ennis and Mart, Texas, and will be completed soon.

Ohio Class "B" Companies Discuss I. C. C. Reports.

Class "B" telephone companies of which there are 19 in the state of Ohio held a meeting Tuesday, September 14, at the Virginia Hotel to consider recommendations of the Interstate Commerce Commission with regard to the subject matter of reports which the Interstate commission will require of these companies at the close of this year Class "B" companies are those companies which have a gross annual revenue of not less than $50,000 and not more than $250,000.

The meeting was called by Frank L. Beam, president of the Ohio Independent Telephone Association, who presided, and was addressed by Le Roy Parker, controller of the Ohio State Telephone Co. Mr. Parker is a member of a national board recently constituted which is in an advisory capacity to the Interstate Commerce Commission. The Interstate Commerce Commission has recently issued a General Order, No. 18, requiring Class "A" and Class "B" companies to furnish information regarding purchases made within the last five years. The object of this information is to give the commission data with which to prepare unit costs in connection with the general appraisal of telephone properties which congress has ordered the Interstate Commerce Commission to make.

Ohio communities interested in this Class "B" convention are as follows: Chillicothe, Norwalk, Springfield, Newark, Marion, Ravenna, Mt. Vernon, New Philadelphia, Ashland, Millersburg, Lima, Ashtabula, Lorain, Bellefontaine, Portsmouth, Elmore, Mansfield, Hamilton and Greenville.

Summary of State Commission Hearings and Rulings.

ARIZONA.

September 15: The hearing in regard to complaints against the rates and charges of the Mountain States Telephone & Telegraph Co., at Tucson, Ariz., scheduled for hearing on this date, has been indefinitely postponed owing to the fact that the engineering investigation and appraisal cannot be completed before that date. The complaints were a result of the elimination of the six-party lines in the company's course of improvements and betterment of service.

September 22: Hearing in regard to complaints against the rates and charges of the Mountain States Telephone & Telegraph Co., in Flagstaff, Ariz.

CALIFORNIA.

August 3: The commission denied the petition of the Valley Telephone Co. for a re-hearing of its application for a certificate of convenience and necessity.

August 3: Sierra Madre Telephone & Telegraph Co., of Sierra Madre, Cal., granted permission to renew five promissory notes aggregating $8,000 for a period not exceeding two years with interest at not to exceed 7 per cent.

August 14: The commission amended its order of July 15 in the matter of the application of the Del Norte People's Telephone Co. for the consent to the renewal of a certain note so as to permit the Del Norte company to issue the note author-

ized in that order to E. C. Hegler. The commission's order of July 15 authorized the Del Norte company to issue, for a period not exceeding one year, a note for the principal sum of $1,000, payable to the Bank of Crescent City, with interest at 8½ per cent., provided applicant submit to the commission for approval a copy of the chattel mortgage securing the payment of the note. The applicant accordingly submitted the copy of the chattel mortgage and requested that the commission's order of July 15 be amended so as to permit it to issue the noted authorized to E. C. Hegler.

September 5: Hearing on the applications of the railroads of the state for relief from provisions of the new law prohibiting the dispatching of trains by telephone and requiring a train dispatcher at every siding.

ILLINOIS.

September 3: Agreement between Leef and Vandenbroeck, proprietors of the Alhambra Telephone Co., Alhambra, Ill., and the Alhambra Mutual Telephone Co. to sell the telephone property of Leef and Vandenbroeck to the Alhambra Mutual Telephone Co., approved. This decision was incorrectly reported in TELEPHONY of September 11, the statement being made that approval had been given by the commission to the purchase of the Mutual plant by Leef and Vandenbroeck.

September 14: Hearing on complaint of J. G. Woker, of Pearl City, Ill., against the Pearl City Independent Telephone Co., on refusal of the defendant company to make physical connection with the Pearl City Mutual Telephone Co.

September 14: Hearing on the petition of citizens of Aledo, by Laon McWhorter, for a consolidation of the People's Telephone Co. and the Home Mutual Telephone Co. in the city of Aledo.

September 15: Hearing on application of the Geneseo Telephone Co., of Geneseo, Ill., for authority to issue its capital stock in the amount of $3,000.

September 28: Postponed hearing on the petition of the DeKalb County Telephone Co., of Sycamore, Ill., for an increase in rates. This action was taken for the purpose of giving the telephone experts of the commission an opportunity to review the inventory submitted by the company's officials.

MASSACHUSETTS.

September 7: Gold & Stock Telegraph Co. and the United Telegram Co., of Boston, Mass., ordered to restore stock ticker service, from New York to Calvin H. Foster, of Boston, on the ground of unjust discrimination. The commission held that the subject matter of the complaint was intrastate in character and not interstate as contended by the respondents.

MICHIGAN.

September 8: Hearing on application of the Citizens Telephone Co. for permission to increase its rates at Lansing, Mich.

October 1: Postponed hearing on application of the Michigan State Telephone Co. for permission to install a modified system of metered service in Detroit.

MISSOURI.

September 17: Hearing at Kansas City at which time the Liberty Telephone Co., of Avondale, Mo., will be given an opportunity to show why Charles Adams should not be granted a certificate of convenience and necessity for the construction and operation of a telephone exchange at Avondale. The application was filed on May 26 by Charles Adams and on June 19 the Liberty Telephone Co. filed an application asking that it be allowed to intervene, which application was granted and a hearing held September 9. A further hearing will be held September 17. Case No. 706.

September 13: Hearing on complaint of C. F. Schafer, of Malta Bend, Mo., against the Malta Bend Telephone Co., alleging poor service and excessive rates. Case No. 672.

NEW YORK.

September 13: Hearing on complaint of Leo E. Ostro, of New York City, against the New York Telephone Co., as to disputed number of calls and excess calls.

September 15: Hearing on complaints of the city of Cohoes, N. Y., the Board of Trade and Business Men's Association of Cohoes, the village of Waterford and the city of Watervliet vs. the New York Telephone Co. and the American Telephone & Telegraph Co., as to rates.

OHIO.

September: A resolution adopted by the Elyria, Ohio, city council has been presented to the commission, asking that a thorough investigation be made of the conditions in Elyria with a view to ascertaining whether the rates of the Elyria Telephone Co. are reasonable and just.

September 4: Complaint filed by the rural subscribers of the Harrison & Jefferson Telephone Co., which operates in Harrison and Jefferson counties, Ohio, alleging that the company is discriminating against them. They alleged that their former small local exchanges had been absorbed by the larger company, which has eliminated all free service between exchanges, imposes exorbitant charges for such service and is now imposing city rates for service in small rural communities with from 65 to 125 subscribers. The commission has notified the company that if the complaint is not adjusted by September 20, it will make a thorough investigation of the matter.

September 10: Hearing on the petition of the Hamilton Home Telephone Co., of Hamilton, Ohio, for an order requiring the Cincinnati & Suburban Bell Telephone Co. to connect with its lines for interchange of service.

OKLAHOMA.

September 14 and 15: The following cases were heard by the Oklahoma Corporation Commission at its monthly court term:

Geary Telephone Co. vs. Watonga Telephone Co. and Pioneer Telephone & Telegraph Co., asking adjustment of toll charges.

Thomas Milling Co., Thomas, Okla., vs. Pioneer Telephone & Telegraph Co., asking improved long distance service.

Comanche Telephone Co., Comanche, et al., vs. Pioneer Telephone & Telegraph Co., to require defendants to furnish complainants with toll tariffs.

Rush Springs Telephone Co., by E. D. Adams, Rush Springs, vs. Pioneer Telephone & Telegraph Co., for adjustment of toll charges.

Comanche Telephone Co., by E. H. Hendricks, Comanche, vs. Pioneer Telephone & Telegraph Co., for adjustment of toll charges.

OREGON.

November 1: Hearing on application of the Coos & Curry Telephone Co. and the Coquille Valley Telephone Co. for permission to increase their rates at Coquille, Ore.

WISCONSIN.

September: The Otter Creek Telephone Co., operating a rural exchange in the vicinity of Stanley, Wis., has been authorized by the railroad commission to issue $200 of stock for additions and extensions.

September: The People's Telephone Co., of Cambria, Wis., has been authorized to issue $400 of stock for the purpose of taking over the Cambria Co-operative Telephone Co.

September: The Valders & Jerpen Telephone Co., of Manitowoc, Wis., has reorganized and increased its capital stock from $1,500 to $14,000. The company owns about 200 miles of wire in this and surrounding counties. Anton O. Berge is president.

September: Petition filed by the Superior Rural Telephone Co. for a hearing of its side of the case in the controversy with a Mr. Carroll who desires telephone service from the rural company, but is unwilling to take it on the same terms as the other members of the company; that is, purchasing his instrument and paying a small amount each month. Some time ago Mr. Carroll filed a complaint with the commission whereupon it ordered the company to furnish him service at a fixed rental charge. The company contends that it cannot continue in business on such a plan and has therefore petitioned the commission for a hearing of its side of the case.

September 7: Hearing on complaint of Herman Kreunen, et al., vs. the Cedar Grove Telephone Co., of Cedar Grove, Wis. U.—819.

September 7: Hearing in re investigation on motion of the commission of the service of the East Valley Telephone Co. and the Theresa Union Telephone Co. in the village of Kewaskum, Wis., and the tolls charged for intercounty service. U.—817.

September 8: Hearing at Fond du Lac, Wis., on the complaint of Rosendale Telephone Co. vs. the Wisconsin Telephone Co., relative to rates and service. U.—708.

September 16: Hearing at La Farge, Wis., on complaint of the Dell Co-operative Telephone Co. vs. the La Farge Telephone Co., in regard to physical connection and rates. U.—823.

September 17: Hearing at Sparta, Wis., on complaint of the common council and board of water commissioners of the city of Sparta vs. the Monroe County Telephone Co., in regard to rates. U.—757.

September 17: Hearing at Sparta, Wis., in re application of the Monroe County Telephone Co., for authority to equalize rates. U.—771.

September 22: Hearing at Unity, Wis., in re investigation on motion of the commission of the alleged inability of W. A. Cutts to secure telephone service from the Unity & Southwestern and Unity Western telephone companies. U.—821.

September 22: Hearing in re application of the New Cashton Telephone Co. for authority to increase rates. U.—803.

September 23: Hearing at River Falls, Wis., in re investigation on motion of the commission of the failure of the Pierce County Telephone Co. to extend its lines to give service to Anton M. Larson and others. U.—818.

Practical Subjects—Letters and Discussions

The Most Important Item.

By the Interrogator.

"The most important item, and one that is often given the least consideration, in any controversy with a public utility, is the *valuation,*" says the editor of American Municipalities, the official bulletin of the League of American Municipalities.

This method of stating the case may satisfy men who feel called upon to oppose the present private owners of utility properties, but is it wise for utility managers, themselves, to accept it as the last word? Isn't there another item that is of greater importance?

The Interstate Commerce Commission is requiring a large number of telephone companies to value their properties and report their valuations with the least possible delay. In view of this fact, will it not pay telephone managers to "read up" on the meaning of this word, value? Webster defines it as follows:

1. Worth: That property or those properties of a thing which render it useful or estimable; the degree of that property or of such properties; utility; power or capacity of procuring or producing good.
2. Price: The rate of worth set upon a commodity; the amount for which a thing is sold, as the value of a thing is what it will bring in the open market.
3. Estimate or the intrinsic worth of a thing; appreciation; esteem.
4. Import: Precise signification, as the value of a word or phrase.
5. In music, the relative duration of a tone as signified by the note.
6. In political economy, worth, as estimated by the power of purchasing or being exchanged for other commodities; the quantity of labor or the product of labor which will exchange for a given quantity of labor or of some other production thereof.
7. In the arts, the relation of the subjects or elements to each other, as the value of coloring.

Exchange value means the same as market price as defined under "market."

Market price is the price for which anything marketable sells in the market; the selling price.

"Value has always more reference to others' estimation (literally, what the thing will avail with others) than worth, which regards the thing in and by itself; thus, 'intrinsic value' is a weaker expression than 'intrinsic worth.' . . . Price always implies that an article is for sale; what a man will not sell, he declines to put a price on.

"Value is the estimated equivalent for an article, whether the article is for sale or not; the market value is what it would bring if exposed for sale in the open market; the intrinsic value is the inherent utility of the article considered by itself alone. The 'market value' of an old and rare volume may be very great, while its 'intrinsic value' may be very small or practically nothing."—Fernald's "Synonyms, Antonyms and Prepositions."

In Cleveland, Detroit, Des Moines and other well known cities, the question of valuation of certain utility properties has caused more or less trouble between the sellers and buyers of utility service, but, as yet, few of the telephone companies have had that sort of difficulty. Nevertheless, it should be kept in mind that the buyers of telephone service are much the same people as the buyers of other utility service. It is all the more necessary to keep this point in mind, just at this time, when the Interstate Commerce Commission is beginning the work of valuing telephone properties.

"The president of the Minneapolis street railway has proposed that the net earnings of his company be turned over to the city," says the editor of American Municipalities.

Does this bit of information end with the words just quoted? Surely not! The president has proposed that the net earnings be turned over to the city, *"after the company has received a fixed return on a specified valuation."*

"Isn't that fair enough?" Mr. "Somebody" inquires. For the answer to this question let us hear what the editor of American Municipalities has to say. Here it is:

"This offer is fair and would no doubt result in a solution of any franchise question *if*" . . . There's the rub! One of those blockading "ifs" stands in the way. Let the managers of telephone properties remember it is with this same class of municipal officers, and with this same class of buyers of service, that they will have to deal in the very near future. Let the telephone manager not forget that the turning over of all the net profits of his company to the city (state or nation), after the company has received a fixed return on a specified valuation, is said to be a fair offer, and one that would settle the issue satisfactorily *"if* the company and the city could agree on a valuation."

Have we not here food for some serious thought? Has not the Twin City Rapid Transit service been spoken of as the best of its kind? Is it not altogether likely that the president of this excellent transportation system is interested, also, in the business of banking?

When the banks in which he has investments are earning and paying to their owners dividends ranging from 12 to 20 per cent. every year, why does he propose that the owners of the transportation business shall turn over to the city everything above 6, 8, or 10 per cent. of their profits?

"Because street cars supply a utility service; and it is considered wrong for those who serve the public to get more than a specified rate of profit," says Mr. Somebody.

But is there not a growing opinion that the business of banking is also a utility? When the law for the regulation of banking was under discussion, prior to its passage by Congress, was it not said, repeatedly, that the banks are just as truly a utility as the railroads?

"But street car lines are *monopolies,*" persists Mr. Somebodybody. Even though, for the moment, that be granted, should not telephone managers ask themselves such questions as these:

Wasn't it for the openly declared purpose of regulating the so-called banking monopoly (the "bankers' trust") that a federal bank commission was created? Isn't it the duty of this federal bank commission to control banking in much the same general manner as the federal railroad commission is expected to control transportation and communication?

But is it a fact, after all, that these street cars have a monopoly of the rapid transit business? If, for instance, you were to attend the orchestra concerts which occur every evening at Lake Harriet (Minneapolis); if you were to see from 1,000 to 3,000 automobiles there, carrying from one to seven passengers each; if you were the owner of the street railway, and saw that your cars were being "relieved" of between 3,000 and 5,000 ten-cent (round trip) fares daily, or $7,500 to $10,000 a month, in this one instance alone—would you still feel so positive that the street cars have an actual monopoly?

Or, if, while owning the street car lines you were to meet from 25 to 30 jitney cars in a ten-minute ride, each jitney loaded down with five to nine "fares," would your pocketbook intuition tell you that your street cars were enjoying a monopoly?

Do not the people generally applaud every time an owner of bank stock sells at a price of $200 or $300 the shares for which he originally paid only $100? Does not everybody

appear to be pleased whenever a bank announces that it has just paid its "usual 4 per cent. (or 5 per cent.) quarterly dividend?"

As a nation, is it not one of our proudest boasts that the same number of acres, which in 1850 (according to the latest official census) were valued at only three billions of dollars, are valued now at thirty-three billions, after making ample deductions to pay for every improvement put on in the meantime? As a people, are we not pleased with the fact that along with this 1,000 per cent. of water or increase in the value or marketable price of our farm-owners' investments, we have established an annual rental rate (or dividend) of from five to ten dollars an acre on land which was either given outright or sold at $1.25 an acre to the fathers or predecessors of the present proprietors?

Does it not please most people to see the owners of bank stock get dividends amounting to 12 and 15 per cent? And does not this give back to the investor his entire original investment once in every seven or eight years?

Are we not pleased when the retired farmer or land speculator gets a rental of $7.50 yearly for land which marketed at $1.25 an acre fifty years ago? Are we not glad to see the owners of banks double, treble and quadruple the selling price of their investments? Are we not delighted whenever they get "a big dividend?" Are we not in favor of allowing the owners of farm acres to sell for $250 an acre the land which "changed hands" fifty years ago for $1.25?

As a people, or a nation, are we not very much wrought up over the alleged or real injustice of a railroad or other utility claiming a present value of $3.75 an acre for right of way or other property for which it may have paid only $1.25 (or one-third) in 1850? Are we not hysterical if any utility earns as large a reward for the money and the management of its affairs as is earned by the banks which we approve and to which we entrust our deposits?

Is not this *state of the public mind* with regard to utility valuation, a matter which is vastly more important to the telephone manager than any of the other elements which affect "the most important item" valuation?

I wanted to make more plain the fact that unless this state of mind (on the part of the people) is effectually dealt with, there is sure to be a tremendous reduction of values of telephone properties—as compared to the values which will be allowed to remain for the other forms of property to which reference has been made. But, isn't the editor beginning to act a little nervous about this being too long? I think he is. Perhaps, therefore, I'd better wait and offer, in another communication, the remainder of what I have in mind concerning this particular phase of the public's mind.

School for Bell and Independent Operators.

Patience, accuracy, courtesy, a willingness to co-operate and a pleasing voice are qualifications essential to an efficient telephone operator, according to W. S. Vivian, of Chicago, secretary of the Independent Telephone Association, of America, who conducted the school for long-distance operators held on Saturday, September 4, in the Commercial Club Rooms in Richmond, Ind.

It was the first school for both Bell and Independent operators held in the United States. Operators and managers representing Indianapolis, Cincinnati, Dayton, Fort Wayne and a score of little towns within a radius of 30 miles of Richmond, were in attendance. Exactly 100 persons were present. John M. Lontz, president of the Richmond Home Telephone Co., welcomed the visitors on behalf of the officers of the company. Attorney Perry J. Freeman, legal advisor of the corporation, gave a brief, humorous address, taking as his subject: "A Soft Answer Turneth Away Wrath and Grievous Words Stirreth Up Anger."

Mr. Freeman maintained that the telephone operators make the best wives because the training they have in performing their duties at the switchboard, comprises the fundamentals necessary to assure wedded bliss. He said a man who would be afraid to marry a telephone operator should not be permitted to marry.

Mr. Lontz said the success which had been achieved by the Richmond Home company which uses automatic telephones, had been due to the operating efficiency. He said the telephone business in Richmond had been completely revolutionized since it was established. Four thousand automatics are now in use in Richmond.

At 10 o'clock in the morning, Mr. Vivian called the meeting to order and introduced Mr. Lontz and Mr. Freeman in turn. W. M. Bailey, general manager of the Richmond company, made a few announcements relative to the entertainment of the operators, before Mr. Vivian began his instructions.

"Telephone companies are beginning to appreciate the need of educating and instructing the girl operators in their duties," said Mr. Vivian in opening his lecture at the morning session. "Not many of these schools have been held, but the movement is growing with astonishing rapidity and will continue to grow if the operators heed the advice given and the service in the various states, improves.

Everything depends upon the operator, the girl operator, because men so far as their ability to become operators, is concerned, are rank failures. A man couldn't learn to become efficient in this work if he lived for a thousand years.

All the rules and instruction books could be thrown aside if the girl operator realized her importance and studied to improve herself and showed that she was big enough, mentally, to grasp the job. Telephone systems most certainly need operators, but they must be efficient operators."

Between 50 and 75 per cent. of the words passing between long distance operators is an unnecessary waste of time, Mr. Vivian said. This was due, he explained, to a lack of attention and indifference to uniformity of rules and shows that the telephone business is just starting. When efficiency is reached through strict obedience to all the rules, the occupation of the girl operator will reach a place similar to other professions and will mean a considerable increase, generally in salaries, he said.

In answering Mr. Vivian's questions, the operators estimated that there were 300,000 telephones in the state of Indiana; 3,600,000 people talk each in 1,800,000 local calls; from 20 to 66 per cent. of the estimated 300,000 long distance calls in one day in Indiana, fail in the first effort to get a connection.

Switchboards were installed at the school for demonstration purposes. Mr. Vivian laid emphasis on the need of the operator sitting erect in her chair, looking directly at the board and speaking directly into the transmitter.

At noon, the operators went to Cliff Dale Auto Club house in Ohio, just across the border from Richmond, where luncheon was served. A two-hour automobile tour followed the meal before the afternoon session of the school was opened.

Dakota Central Acquires Lake Andes Telephone Property.

The Dakota Central Telephone Co., of Aberdeen, S. D., recently purchased the telephone plant at Lake Andes, S. D., formerly owned and operated by C. M. Lokken. The transaction includes the local exchange and rural lines operating from Lake Andes.

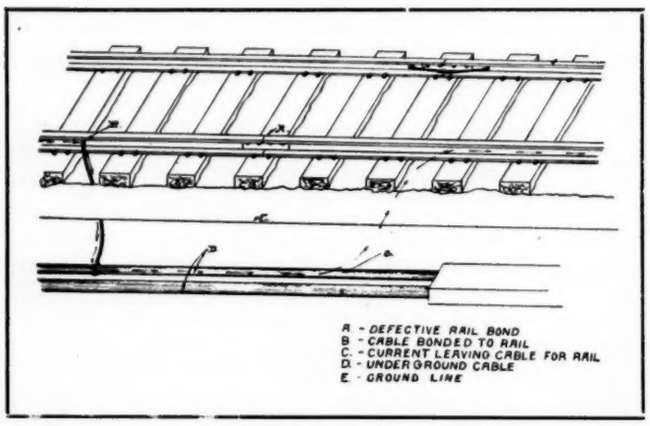
Practical Methods of Telephone Cable Maintenance

A Few of the Many Faults of Cable Maintenance—How the Nature of Each Case is Predetermined and the Fault Located and Repaired—Paper Presented at the Convention of the International Association of Municipal Electricians

By O. F. Tallman

In this paper it is my desire to present, as nearly as possible, a word picture of practical cable maintenance; to illustrate it with a few of the many kinds of faults; and to show how the nature of each is predetermined and the fault located and repaired.

The word practical in the title of this paper is used advisedly, for I wish to keep clear of any technicalities, electrical laws, tables, etc. They can all be readily found in most any electrical handbook or trade journal and can be again forgotten with much less exertion.



Reason Why Bonding Does Not Always Prevent Current Flowing.

Of course, we all know that proper first installation is the best future maintenance assistant. When a system is first installed—whether it be police, fire alarm, telephone, light and power or what not—is the time to consider the future maintenance of that system. A great many troubles which later are classed "unavoidable" can be traced back to poor first installation. A very small percentage of our troubles should be called unavoidable if we properly classify them.

I have seen sections of cable which had been pulled into underground conduits, with nail holes, bullet holes, and crystallized armor—some of the holes large enough to shove your thumb into. They eventually caused much trouble and expense—all because of the absence of proper inspection and supervision at the time of installation. Very often wiped joints are improperly made, due to the workman's inability, or, as in many cases, to his carelessness. These are some of the things that run up maintenance costs.

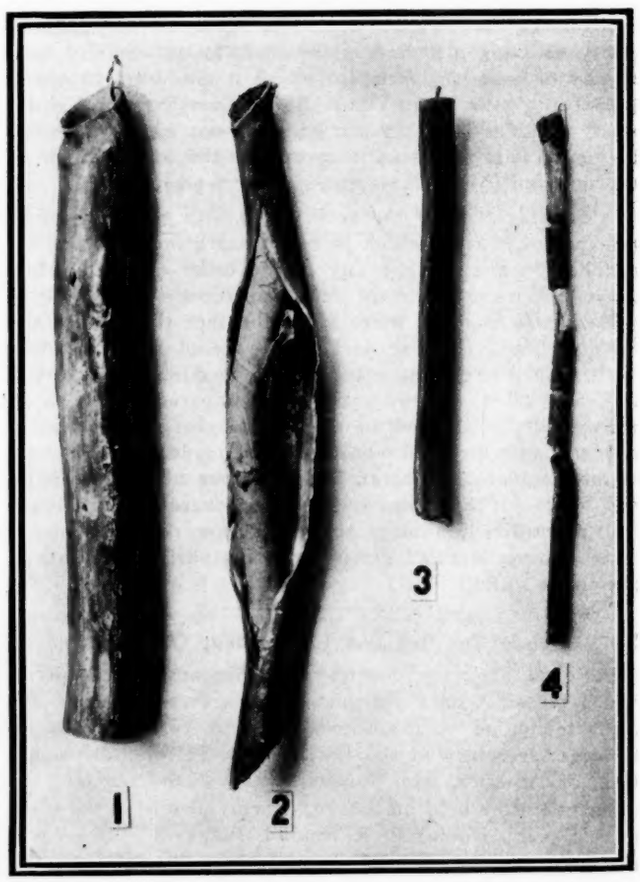
Some of the false steps which can be and are very frequently taken at the time of installing the cable, and which greatly influence its future service, may be enumerated as follows:

1. If ducts are not laid properly, the ends well butted, or if they are disturbed before allowing cement to thoroughly set, the result may be that the sheath of cable will be broken at the time of pulling it into the ducts.

2. All vertical pipes running up poles or buildings from the underground should be given particular attention both as to the setting and the bends. After the cable is installed the top end of the pipe should be properly plugged or capped, so as to exclude rain and snow. In cold climates, if one of these pipes fills up and freezes, the pressure of the ice against the cable sheath will often cause shorts, crosses, etc.

3. The proper supporting of cables in manholes is very important. Suitable racks or rests should be provided. If this is not done, the weight of the cable will, in time, cause it to wear through at the points where it comes in contact with sharp surfaces. The cable should also be protected at the point where it leaves the ducts (in manhole) with thimbles or bushings.

4. Precautions should be taken against electrolysis—"the bugbear of underground cable installation." This one trouble causes more grief than any other, principally for the reason that we know less how to guard against it than any other trouble with which we have to contend. Bonding and grounding appear to be the best methods for combating this evil, and they are not always successful. The stray currents which cause electrolysis are generally found coming from the return or negative side of electric railway lines, and are generally caused by faulty rail bonds, which make the rail a poor return circuit. The electric line at some point or points crosses, or is closely paralleled by a line of underground cable, which is a better return circuit than that provided by a street car rail. The return current takes ad-



Effect on Cable Sheath of Various Kinds of Trouble.

vantage of the close proximity of the cable and leaves the rail for it, using the intervening earth as a conductor.

The combination of earth and conduit, whatever the material may be, makes a very poor or high resistance conductor for these currents; consequently, at the point where they enter the cable sheath or leave it—perhaps an equal number of times—an arcing contact is made. This causes the damage by pitting the armor or sheath until it no longer excludes moisture.

This is the reason for bonding and either grounding or running bond wire from the cable sheath to street car rail. It does not always prove successful, because bonding does not stop the flow of current—it only provides a better conductor, which in some cases might prove more disastrous than no bonding at all.

This subject is one upon which quite a large volume could be written, and I feel that, unless I pass on, it will not be possible to cover the various phases of cable maintenance within the time allotted me.

There are only two practical and sure ways of eliminating electrolysis:

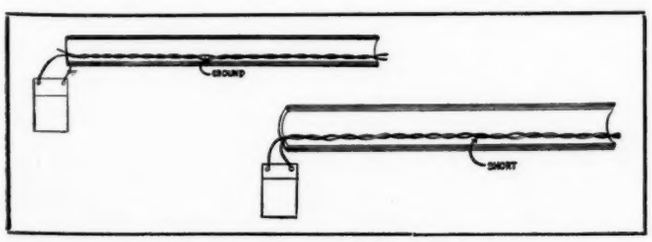
1. To make the return or negative side a safe and capable conductor, either by having the rail properly and continuously bonded or by installing an additional return of proper capacity.

2. To so insulate all cables from ground that they will not offer any conductivity for stray currents.

The second method would be sure, but I am of the opinion that the first is, under present construction methods, by far the most practical.

The reason for installing cables underground is not only to eliminate the objectionable appearance of their being overhead, but also to take advantage of the saving in maintenance costs due to the diminished chances for mechanical injury. Of course, this phase of the situation scarcely ever enters into the many worries of the municipal electrician, the reason being that practically all, or at least a majority of the municipalities, make arrangements with the various public utilities for enough pole and duct space to supply their needs. It is not very often necessary for them to install cable aerially, for the reason that when they get beyond the underground districts they have not a sufficient number of conductors on any one lead to necessitate cabling. If any of you have any aerial cable districts to maintain you can appreciate the fact that a broken cable hanger; cable rubbing against tree, guy wire or pole; branch cables not well lashed and short bends or kinks, can cause a case of trouble any old time. And they usually do so at a time when it is most difficult to locate and repair the trouble.

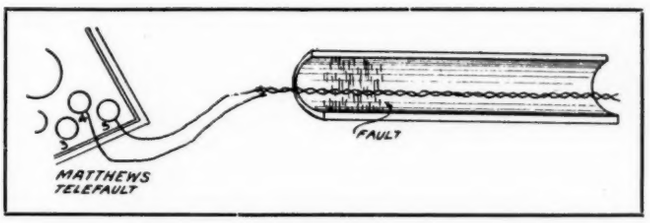
All of the foregoing remarks lead up to the often repeated phrase, "An ounce of prevention is worth a pound of cure," or a more modern slogan would be "Safety First." But



Connections of Telefault for Ground and Short-Circuit.

as is the case in everything else, so it is in connection with the maintenance of cables, very frequently spoken, but infrequently applied. We continue to have troubles that could have been prevented, as well as those of the unavoidable class.

The methods of locating cable and all other electrical circuit faults have progressed rapidly in the last ten years. This has been a great boon to all who are actively concerned in the electrical game. Before that time the maintenance expense of cable was so high that it limited its use to a great extent. Now, with the modern methods and the up-to-date instruments which are in use, it requires only



Connections for Making Location of Wet Cable Trouble.

from one-fifth to one-third the time, and consequently but a fraction of the former expense. It used to take an average of one day to locate a case of cable trouble, and it was not uncommon to spend four and five days on obstinate cases.

The usual process was something like this: If there was anyone who was in any way related to a galvanometer or loop meter man, he would be the one elected to take the readings and make the locations.

One instance is recalled when the location concocted by the "expert," as they were called in those days, was 2,000 feet beyond the end of the cable. Another case was where three men were kept three days patroling a certain section of cable. Finally the fault was found on the afternoon of the third day *on the main frame* by an inside man.

"Those were the happy days!" A maintenance man in those days was called "The Butcher," and he was! It was C. O. and T.—cut, open and test—and when the trouble was finally located and cleared, it took another two or three days going back over the cable to wipe sleeves on all the previously made test openings.

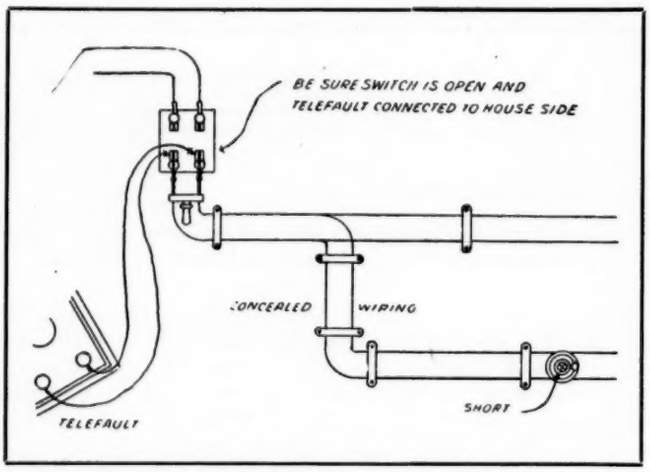
Today, a man with modern facilities locates, on an average, three cases per day. The galvanometer is to some extent still used, but the greatest asset to the present day troubleman is the Telefault method of locating trouble, whether the fault be exposed or entirely concealed inside the armor of cable. An exact location can be made with the aid of this method. The beauty of it is that anyone, who is in any degree familiar with electrical circuits, can successfully locate trouble by this method—"it doesn't require the expert of former days."

If the fault be a ground, one terminal of the Telefault is connected to ground while the other terminal is connected to the wire in fault. If it be a short, the Telefault is connected one terminal to each of the wires in trouble. The object is to form a complete electrical circuit in which the fault to be located and Telefault are included. This creates a field, or zone, limited to this particular circuit over which the rapping or woodpecker-like sound travels when the impulse is furnished by closing the battery switch of the instrument.

The exploring or finding coil (a part of the Telefault instrument) is a specially wound coil connected in series with a telephone receiver. It is so wound that when brought within the field, or zone previously mentioned, it picks up by induction, and transmits to the receiver, the rapping or woodpecker-like noise created by the Telefault instrument.

An article, or actual work report, which appeared in the Union Electric Bulletin, appeals to me as being right in line with the thought I wish to transmit, and that is: "The greatly reduced time and expense of locating faults in cables" by the modern method. Therefore, I am going to read it to you.

"On the night of October 4, about 11:49 p. m., the operator at Substation No. 1 reported a ground on the tie line feeder between Substation No. 1 and Substation No. 3 on the low D. C. system. Shortly after the operator at Substation No. 4 reported another ground on the tie line feeder



Use of Telefault for Tracing a Concealed Circuit.

between Substation No. 4 and Substation No. 3. Ordinarily the trouble department, when it receives such a call, notifies the underground department, and men are sent to patrol the line. This means the inspection of manholes for signs of trouble, and if nothing is found in the manholes that looks like trouble, the only way left is to cut cables and test sections. It takes some time to get the men of the underground department from their homes to the scene of trouble, and when they are ready there is quite a bit of work to be done before the trouble can be located.

The procedure in locating cable trouble is very lengthy and expensive. The first thing to be done is to cut the cable in the center and test to find which half is defective. The defective half is then cut in two and its defective half found by testing, and so on, until the trouble is found to lie between two manholes (manholes are usually at street intersections). When the trouble is located in one block, it is then necessary to pull the cable out and either repair or replace with new cable. The cost of this manner of locating trouble is very great, as each of the cuts in a cable costs approximately $15. It is also a very slow and tedious operation, and would keep the cable out of commission for many hours, in addition to the expense of extra joints to be made in false cuts.

When the trouble was reported by substation operators giving the feeder numbers, Mr. Hendrix, trouble foreman on watch, and Mr. Scullin, referred to the service records and proceeded to locate the trouble, using an instrument in combination with a specially designed coil, which locates trouble by producing a tone in the cable similar to that of a woodpecker rapping on a pole. All that needs to be done is to attach the instrument to the cable which is defective, at the station; carry the headpiece and slide the coil along the cable in different manholes. If the tone is still heard, the operator knows the trouble is still ahead of him. At a distance of two feet beyond the trouble no tone will be received. Thus the trouble can be located to almost an inch where cable is defective. The operation is much quicker and more simple than cutting and testing and does not cost anything to repair false cuts.

In the first case cited, the trouble was located in 25 minutes after ground was reported. The men went straight to the manhole where the cable was defective and repaired it while the trouble department was locating the trouble on the second cable, after which the underground department repaired it. Both tie lines were placed in service early on the morning of October 5.

In this case the instrument saved something like $50 in labor and material and placed the lines in operation some 24 hours before the old method would have done so, thus three plants were saved from running when one was all that was necessary, and, lastly, our code word 'Service' was kept from being tarnished."

A number of typical cases of cable trouble are shown in the photograph. In the cable marked "1" the trouble is due to electrolysis, the pitted condition of the sheath being shown. The second case was due to an inside burn. High voltage current burned across from conductor to the sheath. The third illustration is that of a sheath flattened by the compression of water freezing in a lateral pipe. The appearance of a crystallized cable armor in an advanced stage is shown in the fourth case.

From Factory and Salesroom

Convention: Independent Telephone Association of America, San Francisco, Cal., October 26-29

Increasing Popularity of the Union Carboy Inclinator.

Horace M. McCord & Co., of Minneapolis, Minn., have advised that their list of customers is constantly increasing and among the telephone companies who are now using the Union carboy inclinator are the Rochester Telephone Co., Rochester, N. Y.; the Pioneer Telephone & Telegraph Co., Oklahoma City, Okla.; the Southern Bell Telephone & Telegraph Co., Atlanta, Ga.; the La Crosse Telephone Co., La Crosse, Wis., and the Mankato Citizens' Telephone Co., Mankato, Minn.

The benefits of the Union carboy inclinator make it an indispensable device for those who buy their acids in carboy lots. It is said that it can be operated quickly and with absolute safety by one man. It is a protection against loss accruing from broken carboys not only of the fluid itself but stock which may be damaged through contact with the acid.

Without an inclinator, it is said that it requires the services of two or three men to handle a carboy in pouring, all of them being liable to injury to themselves or their clothing in case of the carboy slipping or breaking.

Full particulars may be obtained by writing to Horace M. McCord & Co., 834 Lumber Exchange Building, Minneapolis, Minn.

The Flint Motor Truck.

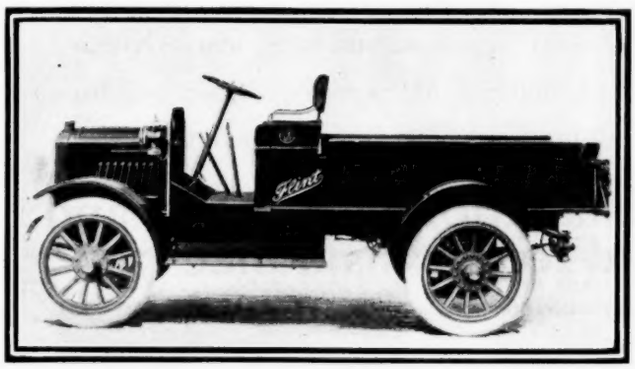
Building commercial cars is an industry entirely separate from that of pleasure cars for two reasons: First, and of the greatest importance, when you purchase a truck you want the most economical facilities for the prompt delivery of your goods. This means, primarily, the best loading accommodation.

Second, the mechanically successful commercial car is absolutely foreign in construction to the other type. Scientific loading is all-important and the truck most appropriate is that which is built by those who are competent to design loading space.

The Flint commercial car department of the Durant-Dort Carriage Co., of Flint, Mich., contends that in the economical feature the Flint truck is superior. Four-fifths of the over-

all length is correctly constructed loading space and the entire vehicle is only one-half as long as a horse-drawn wagon.

It is said that the Flint truck, which is shown in the accompanying illustration, represents the consummation of three years' careful investigation and that it typifies a design of



The Flint Truck Which Is Especially Adapted to Telephone Work.

motor truck that will withstand all possible service conditions.

The Flint catalog, which goes into a detailed discussion of the truck, its character and specifications, may be had by interested parties upon request.

The F. M. C. Steel Guy Terminal and Cable Grip.

A steel guy terminal especially adapted for dead-ending purposes is manufactured by the Fargo Mfg. Co., of Poughkeepsie, N. Y. It is made on the principle of the cone compression type of the other F. M. C. specialties. It is said that the strand will break before the grip is released. The terminal is made in sizes that will accommodate wire from No. 10 B. & S. gauge down to No. 2 and also various sizes of messenger wire.

Telephone companies sometimes have occasion to take a branch from a messenger. For that purpose the all-steel Fargo cable grip is well adapted. The main messenger passes through the head of the grip while the tap is placed in the compression cone. It is stated that this has a grip which will stand a strain up to 45,000 pounds to the square inch before it will give way. Further information relative to the terminal and the grip may be obtained upon request.

Paragraphs.

THE GARFORD MFG. CO., of Elyria, Ohio, through its Kansas City branch, has received the contract of the Mansfield & Ava Telephone Co., of Ava, Mo., for a new 350-line multiple switchboard.

MATHIAS KLEIN & SONS, of Chicago, manufacturers of linemen's electrician's and mechanic's tools, are sending out to the trade their new catalog No. 16. Some space is devoted to a brief history of the growth of the house of Klein & Sons from a small blacksmith's shop in 1857 to a large factory at Belmont and Kedzie avenues, occupying a floor space of about 53,580 square feet. In this catalog are listed, described and illustrated the well known Klein products including pliers for every need, climbers, splicing clamps, safety straps and belts, tool bags, tool kits, linemen's gloves, tree trimmers, the Klein pay-out and take up-reels and the Wasson reel which was recently taken over by Klein & Sons, torches, soldering furnaces, etc. Anyone not receiving a copy of the new Klein catalog may obtain one upon request.

THE CRACRAFT, LEICH ELECTRIC CO., of Genoa, Ill., has been awarded the contract for supplying the new central office equipment for the Morenci Telephone Co., Morenci, Mich. The switchboard will be of the magneto multiple type, which is ever increasing in popularity, a combined toll board and chief operator's desk will also be furnished and all battery and power equipment necessary for the operation of an efficient and up-to-date plant.

THE M. W. DUNTON CO., Providence, R. I., has issued a circular entitled "What Users Say About 'Nokorode'," which contains a number of convincing testimonials from users of Nokorode soldering paste. A copy of this folder will be sent to any interested, upon request.

THE AMERICAN STEEL & WIRE CO., of Chicago, has been awarded the grand prize by the Panama-Pacific International Exposition for the superiority of its products and the high character of its exhibit.

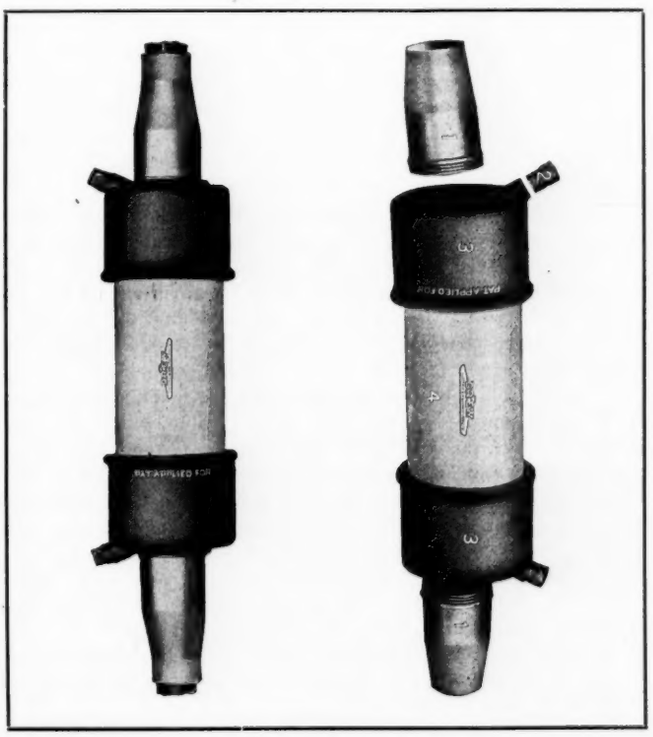
Drew Cable Insulator and Splicing Sleeve.

A combination insulator and splicing sleeve, which is especially adapted to telephone underground construction work, has been placed on the market by the Drew Electric & Mfg. Co., of Indianapolis, Ind.. This cable insulator is said to perform two important functions in the protection of power cables:

First. Used as an insulator in the cable sheath, it will destroy the conductivity of the sheath by dividing it into short sections and prevent its collecting current from earth and underground structures.

Second. Used as a splicing sleeve, it eliminates the danger of leakage at the splice, as the insulator will stand up against any voltage.

In the accompanying illustration showing the insulator partly disassembled, the parts numbered "1" are cast brass tubes, tapered and threaded into the malleable end castings numbered "3." The openings for filling joints with insulating compound are indicated "2." The malleable iron end castings, "3," are leaded onto the middle section, "4," a high-grade porcelain



Drew Insulator on a 1,250,000 C. M. Cable—Partly Disassembled.

tube 12 inches long with a three-quarter inch wall thoroughly glazed inside and outside.

Very little taping is necessary with the Drew cable insulator, as the porcelain is of sufficient length to reach considerably over the lead at either end, leaving no risk to the taping for insulation. There are many places where the Drew in-

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

JOHNS-MANVILLE Service is not "long distance" service—not "service" by correspondence.

Forty-eight J-M organizations in as many North American cities make J-M Service a man-to-man proposition no matter where you are located.

J-M Fibre Conduit is an installation cost cutter and the best underground feeder insurance

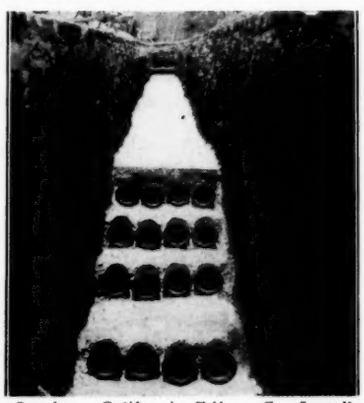
It needs little argument to convince the experienced distribution man that with a material that is light, unbreakable and easy to assemble, he can do more work per day with the same crew.

The installation figures that have been computed from actual operations show that J-M Fibre Conduit effects a positive saving.

The life of the conduit in the ground and its performance under severe electrical disturbances indicates that it is the ideal duct for underground distribution.

We have tests on J-M Fibre Conduit to prove this, too. Send for them.

Approved by the National Board of Fire Underwriters.



Southern California Edison Co. Installing J-M Fibre Conduit in Los Angeles.

H. W. JOHNS-MANVILLE CO.

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sulator may be used to good advantage other than in straight line cables. For instance, it may be used in manholes entering buildings where, it is said, it prevents the cable from collecting stray currents from steel structures or other exposures due to numerous pipes and cables being on the same support.

It may also be used to separate cables at or near switchboards or power houses. In straight line leads, it is claimed, it will positively prevent cables from collecting current. The number of insulators necessary must be governed by the conditions to which the cables are exposed and the number of places where it may be found necessary to separate cables from each other.

To install, the two bronze end tubes are taken off the insulator and slipped over the ends of the cable which are to be spliced. The main body of the insulator is then slipped over either cable end and the cable is spliced in the usual way. The insulator is then drawn forward over the splice. End castings No. 1 are screwed tightly into place and a wipe joint made to the cable sheath. The plugs marked "2" are removed and the insulator is filled with splicing compound through one of the ⅜-in. holes. The plugs are again screwed in place and the splice and cable are protected for "keeps."

Further information and descriptive literature relative to the new Drew combination insulator and splicing sleeve may be obtained upon request.

To Make Physical Valuation of Leavenworth, Kan., Plant.

A physical valuation of the People's Home Telephone Co., of Leavenworth, Kan., is to be made by the telephone engineering firm of Sloan, Huddle, Fuestell & Freeman, of Madison, Wis., for the purpose of finding the cause why the plant has lost money in the past two years, and to place it on a paying basis without an increase in rates, if possible. It is estimated that it will require two months to complete the valuation work.

Operators Receive Increase Under Minimum Wage.

On September 1 advances of wages were put into effect in all the Arkansas offices of the Southwestern Telegraph & Telephone Co., under the provisions of the minimum wage law passed by the last legislature. About 200 employes are affected, and the advances average, it is said, about 25 per cent. for the class of help coming within the provisions of the law. Beginners formerly received $10 to $17.50, and all are now to receive $20 per month.

Keystone Comparative Statement of Earnings.

The Keystone Telephone Co., of Philadelphia, Pa., has issued its comparative statement of earnings for the combined companies for the month of August and for the eight months ended August 31, 1915, as follows:

	For Month Ended Aug. 31, 1915	Year Previous	For Eight Months Ended Aug. 31, 1915	Year Previous
Gross earnings	$114,330	$112,546	$899,154	$880,262
Operating expenses and taxes	57,146	53,608	447,192	433,452
Net earnings	$ 57,184	$ 58,938	$451,962	$446,810
Less interest charges	26,868	26,037	212,472	207,853
Net surplus	$ 30,316	$ 32,901	$239,490	$238,957

Ohio State Company Declares Dividend.

At the regular quarterly meeting of the directors of the Ohio State Telephone Co., of Columbus, Ohio, the regular quarterly dividend of 1¾ per cent. on the preferred stock of the company was declared. This dividend will be paid October 1 on stock of record September 20.